NEC

User's Manual

V850ES/Jx3-E – Network it!

Demonstration Kit for the V850ES/Jx3-E 32-bit RISC microcontroller

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NEC Electronics Corporation
1753, Shimonumabe, Nakahara-ku,
Kawasaki, Kanagawa 211-8668,
Japan
Tel: 044-435-5111
http://www.necel.com/

NEC Electronics Inc. (U.S.)
Santa Clara, California
Tel: 408-588-6000
800-366-9782
http://www.am.necel.com/

NEC Electronics (Europe) GmbH
Duesseldorf, Germany
Tel: 0211-65 03 0
Fax: 0211-65 03 1327
http://www.eu.necel.com/

United Kingdom Branch
Cygnus House, Sunrise Parkway
Linford Wood, Milton Keynes
MK14 6NP, U.K.
Tel: 01908-691-133

Succursale Française
9, rue Paul Dautier, B.P. 52
78142 Velizy-Villacoublay Cédex
France
Tel: 01-3067-5800

Tyskland Filial
Täby Centrum
Entrance S (7th floor)
18322 Täby, Sweden
Tel: 08 638 72 00

Filiale Italiana
Via Fabio Filzi, 25/A
20124 Milano, Italy
Tel: 02-667541

Branch The Netherlands
Steijgerweg 6
5616 HS Eindhoven
The Netherlands
Tel: 040 265 40 10

NEC Electronics (China) Co., Ltd
7th Floor, Quantum Plaza, No. 27 ZhiChunLu Haidian
District, Beijing 100083, P.R.China
Tel: 010-8235-1155
http://www.cn.necel.com/

Shanghai Branch
Room 2509-2510, Bank of China Tower,
200 Yincheng Road Central,
Pudong New Area, Shanghai, P.R.China P.C:200120
Tel:021-5888-5400

Shenzhen Branch
Unit 01, 39/F, Excellence Times Square Building,
No. 4068 Yi Tian Road, Futian District, Shenzhen,
P.R.China P.C:518048
Tel:0755-8282-9800

NEC Electronics Hong Kong Ltd.
Unit 1601-1613, 16/F., Tower 2, Grand Century Place,
193 Prince Edward Road West, Mongkok, Kowloon, Hong
Kong
Tel: 2886-9318
http://www.hk.necel.com/

NEC Electronics Taiwan Ltd.
7F, No. 363 Fu Shing North Road
Taipei, Taiwan, R. O. C.
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238A Thomson Road,
#12-08 Novena Square,
Singapore 307684
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Yeoksam-Dong, Kangnam-Ku,
Seoul, 135-080, Korea
Tel: 02-558-3737
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Revision History

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1. Introduction

V850ES/Jx3-E - Network it! is an Ethernet and USB demonstration kit for the NEC V850 32-bit microcontroller family. It allows the development of an Ethernet and/or USB system based on the V850ES uPD70F3783 device. It supports on-board debugging and real time execution of application programs.

1.1 Main features of V850ES/Jx3-E - Network it!

- Easy to use device demonstration capabilities
  V850ES/Jx3-E - Network it! contains elements to easily demonstrate simple I/O-functions, i.e. I/O lines, Ethernet interface, USB interface, analog inputs and outputs, UART serial interface etc.

- On-Board debug function
  The *V850ES/Jx3-E - Network it!* supports an On-Board debug function by using the IAR C-SPY debugger without a need of additional debug hardware. It allows FLASH downloading and standard debug functions like code execution, single stepping, breakpoints, memory manipulation etc.

- Power supply by USB interface or via external power supply

- Various input / output signals and communication capabilities available, such as

  ° Seven Segment LED
  ° Two switches prepared for key interrupt generation
  ° CAN interface
  ° Ethernet interface

- The IAR Embedded Workbench for V850 and the IAR C-SPY debugger / simulator are included. These packages are restricted in such that maximum program code size is limited to 64 KB.

- Full documentation is included for the NEC V850ES uPD70F3783 microcontroller, IAR Systems Embedded Workbench and IAR Systems C-SPY debugger / simulator.

1.2 System requirements

Host PC

A PC supporting Windows 2000, Windows XP or Windows Vista is required for the IAR Systems Embedded Workbench demo-version.
A Pentium processor with at least 1 GHz CPU performance, with at least 256 Mbytes of RAM, allowing you to fully utilize and take advantage of the product features. 500 Mbytes of free disk space and an additional 10 Mbytes of free disk space on the Windows system drive.

A web browser and Adobe Acrobat Reader to be able to access all the product documentation.

Host interface

USB interface that enables communication based on USB (Ver1.1 or later)
Ethernet interface that enables communication based on IEEE802.3 norm.
100BASE-TX/10BASE-T (For sample program execution)

Network Settings (recommended):
IP Address: 192.168.0.10
NetMask : 255.255.255.0

1.3 Package contents

Please verify that you have received all parts listed in the package contents list attached to the *V850ES/Jx3-E - Network it!* package. If any part is missing or seems to be damaged, please contact the dealer from whom you received your *V850ES/Jx3-E - Network it!*.

Note: Updates of the IAR Embedded Workbench for V850 documentation and/or utilities for *V850ES/Jx3-E - Network it!*, available, may be downloaded from the NEC WEB page(s) at **http://www.eu.necel.com/update/index.html?id=323**

1.4 Trademarks

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2. *V850ES/Jx3-E - Network it!* System Configuration

The *V850ES/Jx3-E - Network it!* system configuration is given in the diagram below:

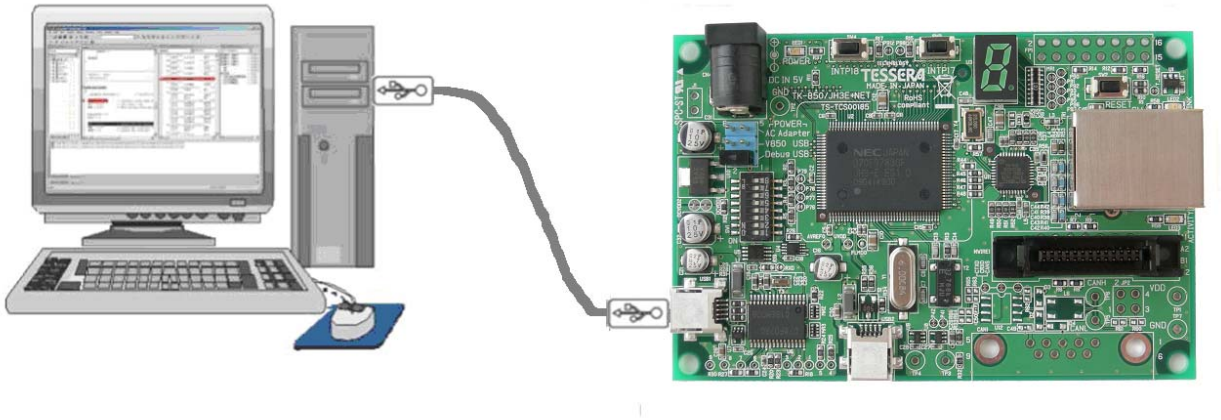


Figure 1: *V850ES/Jx3-E - Network it!* System Configuration

2.1 V850ES/Jx3-E - Network it!

V850ES/Jx3-E - Network it! is an Ethernet and USB demonstration kit for the uPD70F3783 32-bit microcontroller of the V850 family. The demonstration board is connected to the host system via USB interface cable. The host system may be used for On-Chip debugging by using the IAR C-SPY debugger and to allow execution of application programs on the *V850ES/Jx3-E - Network it!* starter kit.

2.2 Host computer

The USB host interface enables communication to the *V850ES/Jx3-E - Network it!* board. The µPD78F0730 78K0 8-Bit microcontroller with on-chip USB interface and the NEC virtual UART driver allows application software to access the USB device in the same way as it would access a standard RS232 interface.
The NEC virtual UART driver appears to the windows system as an extra Com Port, in addition to any existing hardware Com Ports.

2.3 Power supply via USB interface

The *V850ES/Jx3-E - Network it!* board is powered by the USB interface. Optional the power supply can be applied via the connector CN4.

3. *V850ES/Jx3-E - Network it!* Hardware

3.1 Hardware Components

The *V850ES/Jx3-E - Network it!* board is equipped with Ethernet and USB connectors and with several connectors in order to be connected to host computers, FLASH programmer or any external target hardware.

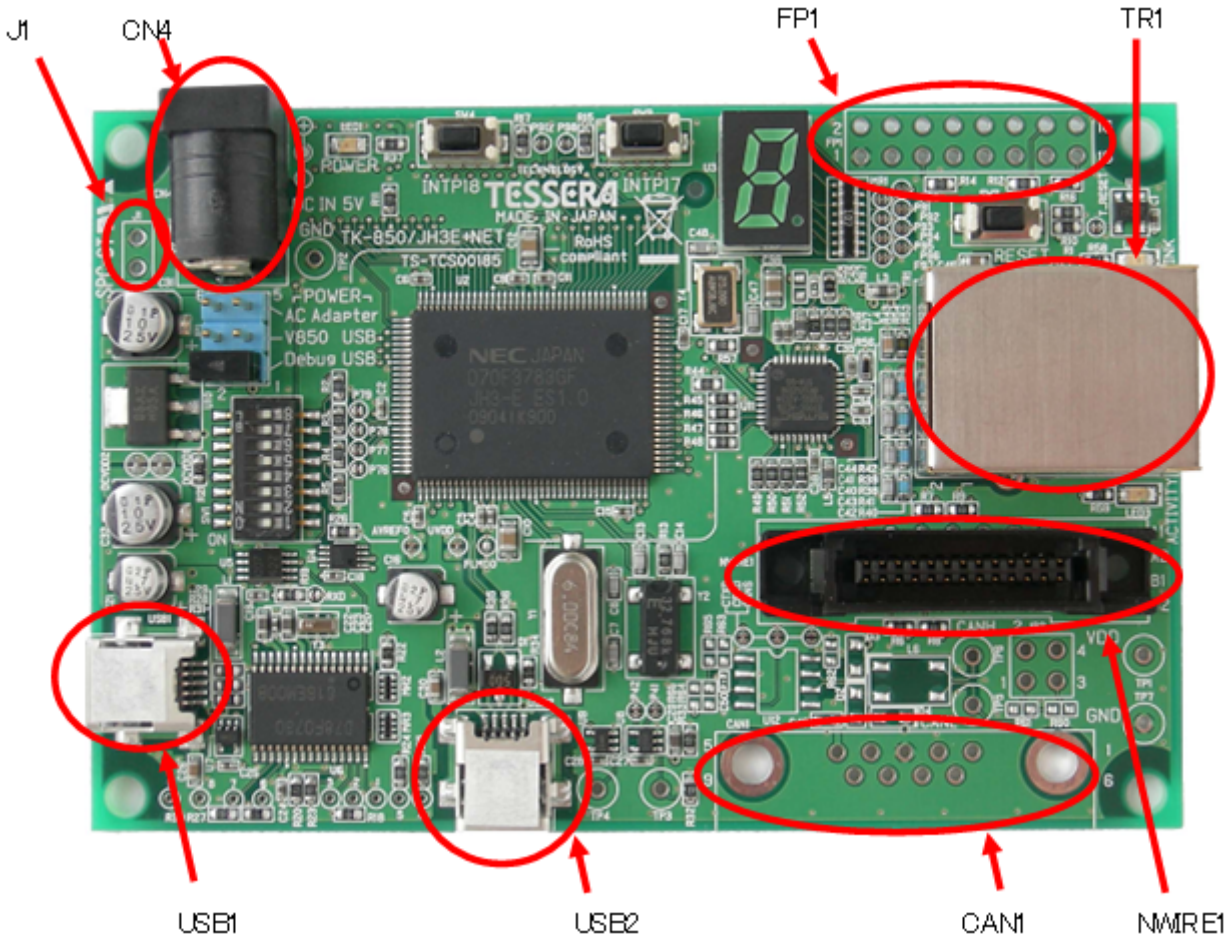


Figure 2: *V850ES/Jx3-E - Network it!* Connector Layout

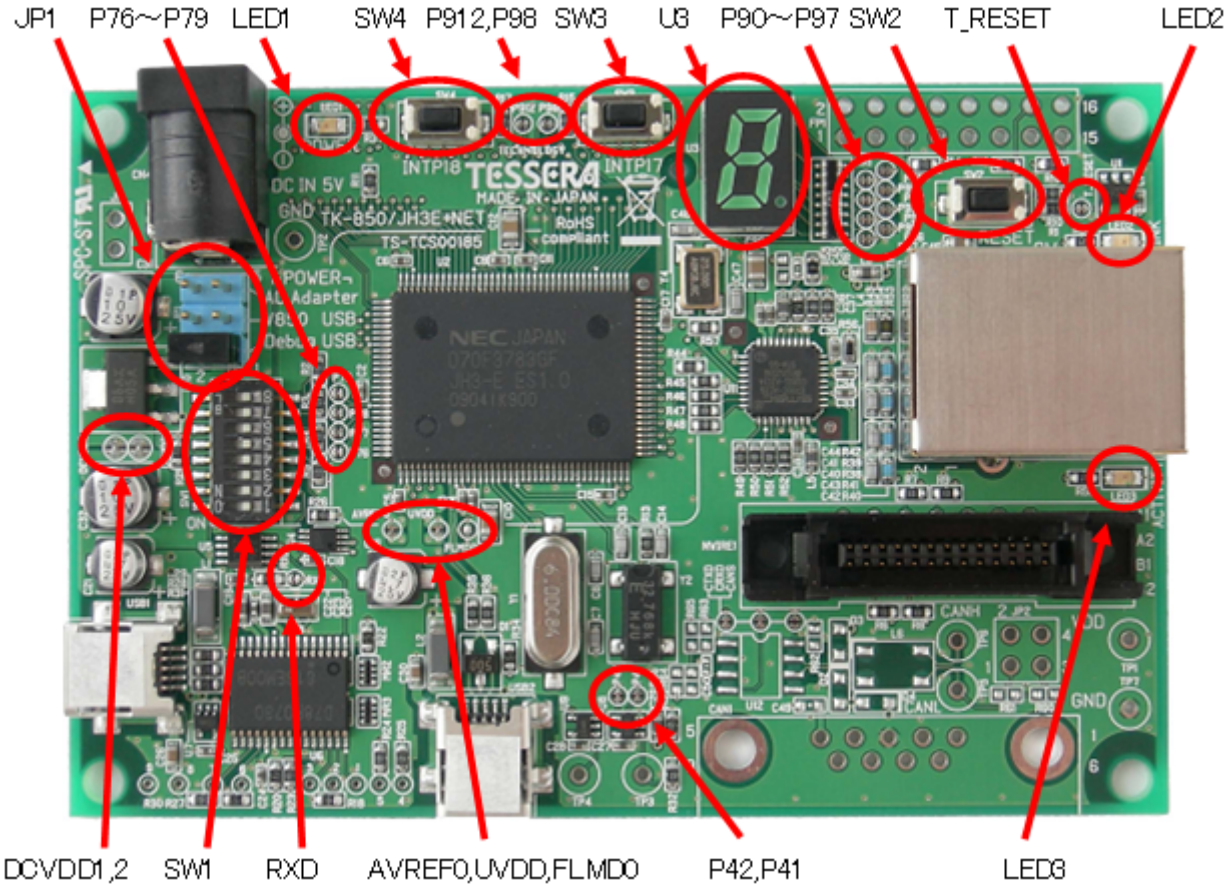


Figure 3: *V850ES/Jx3-E - Network it!* Function Layout

Some of the *V850ES/Jx3-E - Network it!* components are free for user application hardware and software. Please read the user's manual of the uPD70F3783 device carefully to get information about the electrical specification of the available I/O ports before you connect any external signals to the *V850ES/Jx3-E - Network it!* board.

3.1.1 SW1, Configuration switch (DIP-Switch)

The different operation modes of the *V850ES/Jx3-E - Network it!* board can be set by switch SW1. The bits 1-4 of DIP switch SW1 are for the mode setting of the board, bits 5-8 are connected to the pins “P76/ANI6”, “P77/ANI7”, “P78/ANI8” and “P79/ANI9” of the V850 microcontroller and can be used for user application purpose.

The *V850ES/Jx3-E - Network it!* starter kit can be used in the following operation modes:

- On-Board debug mode
  - Start a debug session using the On-Board debug interface
- Flash-Programming Mode
  - Program an application to the build-in flash memory of uPD70F3783 by WriteEZ5-programmer
- Stand alone mode
  - Run a program stored in built-in flash memory of the uPD70F3783 device
- N-Wire debug mode
  - Start a debug session using an N-Wire emulator, e.g. MINICUBE
- Virtual serial COM port mode
  - In this mode USB can be used as virtual serial COM port.

SW1 / bit	On-Board Debug Mode	Flash Programming Mode	Stand alone Mode	N-Wire Debug Mode	Virtual serial COM port Mode
1	OFF	OFF	OFF	OFF	OFF
2	ON	ON	OFF	OFF	OFF
3	ON	ON	OFF	OFF	OFF
4	ON	ON	ON	ON	ON

Table 1: Mode Setting, Switch SW1

Note: After changing the configuration of SW1 bits 1-4 it is necessary to power-up the *V850ES/Jx3-E - Network it!* board to make changing active. This can be done by simply disconnecting and reconnecting the USB interface cable.

3.1.2 SW2, RESET button

SW2 is the reset button and controls the reset input signal of the *V850ES/Jx3-E - Network it!* microcontroller.

3.1.3 SW3, Switch (INTP17)

SW3 is a push button connecting VSS to external interrupt input INTP17 of the microcontroller. This is equal to port ”P98/TENC01/INTP17/A8” of the uPD70F3783 device. The port may be programmed to generate the external interrupt INTP17. The necessary initialization for this purpose is described in the user’s manual of the uPD70F3783 device.

3.1.4 SW4, Switch (INTP18)

SW4 is a push button connecting VSS to external interrupt input INTP18 of the microcontroller. This is equal to port ”P912/TOAB1OFF/INTP18/A12” of the uPD70F3783 device. The port may be programmed to generate the external interrupt INTP18. The necessary initialization for this purpose is described in the user’s manual of the uPD70F3783 device.

3.1.5 JP1, Power Supply selector

Jumper JP1 is the power supply selector of the *V850ES/Jx3-E - Network it! board*.

JP1	Power Supply Source
1-2 short	USB connector USB1
3-4 short	USB connector USB2 (built-in USB function controller)
5-6 short	AC/DC adapter via connector CN4

Table 2: Power Supply Selector, JP1

Note: If multiple connections made to USB1, USB2 and CN4/J1, set JP1 to the preferred power supply route.

3.1.6 LED1, Power LED

LED1 is the power LED of the *V850ES/Jx3-E - Network it!* board. It indicates if power is applied to the *V850ES/Jx3-E - Network it!* board.

3.1.7 LED2 and LED3, Ethernet status LEDs

LED2 and LED3 indicate the status of the Ethernet transceiver of the *V850ES/Jx3-E - Network it!* board.

	Silkscreen	Function
LED2	LINK	Indicates a connection
LED3	ACTIVITY	Indicates the activity

Table 3: Ethernet Status LEDs, LED2 and LED3

3.1.8 CN1, Extension connector (not assembled)

CN1 is a 100-Pin extension connector (FX8C-100P-SV6 by Hirose Electric Co., Ltd.) and can be used to connect additional external hardware to the *V850ES/Jx3-E - Network it!* board.

3.1.9 CN4, AC power supply connector

CN4 is the AC power supply connector of the *V850ES/Jx3-E - Network it! board*. Please connect only a power supply with an output of maximum +5V DC to the board.

JACK	Input
Centre	VDD (+5V)
Ring	GND

Table 4: CN4 Connector

3.1.10 CN5, Extension connector (not assembled)

CN5 is a 30-Pin extension connector (DF17(3.0)-030DS-0.5V(57) by Hirose Electric Co., Ltd.) and can be used to connect additional external hardware to the *V850ES/Jx3-E - Network it!* board.

3.1.11 J1, Optional power supply connector (not assembled)

J1 is an optional connector for an external power supply. Please connect only a power supply with an output of maximum +5V DC to the board.

3.1.12 FP1, MINICUBE2 connector (not assembled)

FP1 (not assembled, solder pads) allows connecting a MINICUBE2 to the *V850ES/Jx3-E - Network it!* board.

3.1.13 CAN1, CAN interface connector (not assembled)

The 9-Pin D-Sub connector allows serial communication following the CAN protocol.
CAN0 module of the uPD70F3783 will be used for communication.

3.1.14 TR1, RJ-45 connector

RJ-45 connector socket (TDK TLA-6T718) which allows using the Ethernet functionality of the *V850ES/Jx3-E - Network it!* board. It is connected to the 10/100 Ethernet transceiver, LAN8700C.

3.1.15 NWIRE1, N-Wire connector

Connector NWIRE1 allows connecting an N-Wire On-Chip debug emulator, e.g. MINICUBE, to the *V850ES/Jx3-E - Network it! board*. Please note, the QB-V850MINI On-Chip debug emulator is a separate product from NEC and it is not included in this starter kit package.

3.1.16 U3, Seven-segment-LED

The seven-segment-LED U3 is connected to the port 9 bits 0-7 of the uPD70F3783. Output a zero to light the corresponding segment.

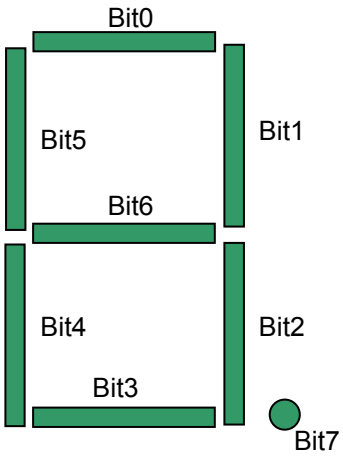


Figure 4: Seven-Segment-LED U3

To display the characters ‘0’ to ‘9’ output the following values to the pins of port 9:

Character	Value
0	0xC0
1	0xF9
2	0xA4
3	0xB0
4	0x99
5	0x92
6	0x83
7	0xF8
8	0x80
9	0x98

Table 5: Display Examples

3.1.17 USB1, Debug connector (Type Mini-B)

This interface allows connecting the IAR C-SPY debugger to the *V850ES/Jx3-E - Network it! board* in order to use the On-Board debug function. The interface supports On-board FLASH erasing / programming and standard debug features like code execution, single stepping, breakpoints, memory manipulation etc.

The power supply of the *V850ES/Jx3-E - Network it!* board is also provided by the USB1 connector.

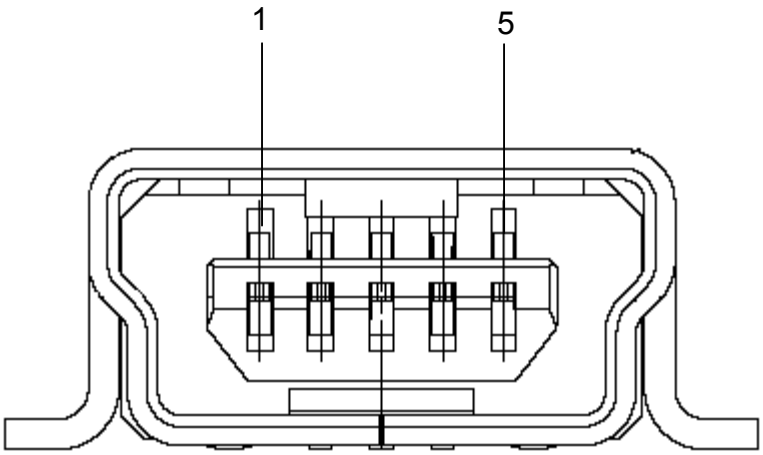


Figure 5: USB1, USB Mini-B Type Host Connector Pin Configuration

Connector USB1	Signal Name
1	VBUS
2	D-
3	D+
4	ID_NC
5	GND

Table 6: Pin Configuration of Connector USB1

For connection with the host machine, use a USB cable (Mini-B type). For confirmation, NEC Electronics used only the USB cable delivered with the *V850ES/Jx3-E - Network it!* board.

3.1.18 USB2, Universal serial bus connector (Type Mini-B)

The interface allows connecting the built-in USB function controller of the uPD70F3783 with a host system. It is also possible to provide the power supply of the *V850ES/Jx3-E - Network it!* board by the USB2 connector.

For connection with the host machine, use a USB cable (Type Mini-B). For confirmation, NEC Electronics used only the USB cable delivered with the *V850ES/Jx3-E - Network it!* board.

3.2 Layout of solder-short pads

Several pins of the uPD70F3783 microcontroller are connected to solder short-pads. The pads can be opened by the user to add user specific functions. The signal connected to each solder-short pad is printed on the *V850ES/Jx3-E - Network it!* board. To open a circuit, cut the narrow part of the pad with a knife. To short a circuit again, join the separated pad with a soldering iron.

Figure 6: Solder-short pad shortened shape

Figure 7: Solder-short pad opened shape

Solder-short pad name	Shipping state	Connection
T_RESET	Short	U1 Pin4 to T_RESET Open when the on-board Reset Circuit is not used.
P90 - P97	Short	7-segment LED Open when using it for other purposes
FLMD0	Short	FLMD0 to CPU port P37 Open pad if flash self-programming is not used.
AVREF0	Short	AVREF0 to VDD Open when AVREF0 is driven by other voltages
DCVDD1,2	Short	Regulator output to VDD Open when you supply the power from CN1
UVDD	Short	UVDD to VDD Open when UVDD is driven by other voltages
TXD	Short	Open when P90 is used for other purposes
RXD	Short	Open when P91 is used for other purposes
P76 - P79	Short	Bits 5-8 of SW1 Open when P76 – P79 are not used for general-purpose input SW
P98	Short	P98 to SW3 Open when using it for other purposes
P912	Short	P912 to SW4 Open when using it for other purposes
P42	Short	P42 to USB D+ pull-up signal pin Open when you do not use USB D+ pull-up signal
P41	Short	P41 to USB D+ pull-up enable signal pin Open when you do not use USB D+ pull-up enable signal

Table 7: Solder-Short Pad Connection

4. On-Chip Debugging

The *V850ES/Jx3-E - Network it!* board offers three possibilities to use On-Chip Debugging (OCD). The On-Board debug function of *V850ES/Jx3-E - Network it!* allows On-Chip debugging without a need of external debug hardware. Within this mode the default USB connection to the Host computer based on the virtual UART driver is used as debug interface. All standard debug functions are available in the On-Board debugging mode like FLASH programming / downloading, code execution, single stepping, breakpoints, memory manipulation etc.

Additionally *V850ES/Jx3-E - Network it!* supports the QB-V850MINI On-Chip debug emulator in order to use On-Chip debug function of the uPD70F3783 device.

Finally, *V850ES/Jx3-E - Network it!* also supports the MINICUBE2 On-Chip debugger to benefit from the On-Chip debug function of the uPD70F3783 device. Nevertheless, the connector for MINICUBE2, FP1, is not assembled on the board.

The system configuration for On-Chip debugging is shown in figure below (OCD via MINICUBE2 is not shown in this figure as the connector is not provided).

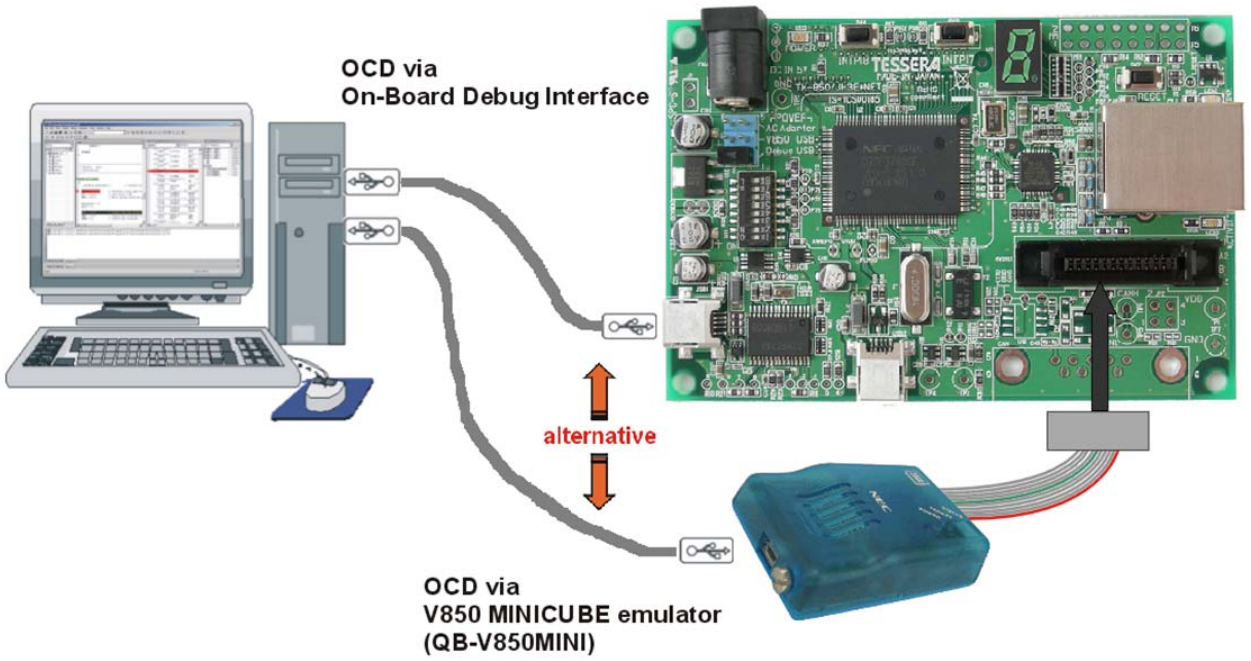


Figure 8: On-Chip Debugging

4.1 OCD via On-Board debug function

To operate the *V850ES/Jx3-E - Network it!* board within the On-Board debug mode, configure switch SW1 bits 1-4 as following:

SW1/bit	Configuration
1	OFF
2	ON
3	ON
4	ON

Table 8: OCD via On-Board Debug Function

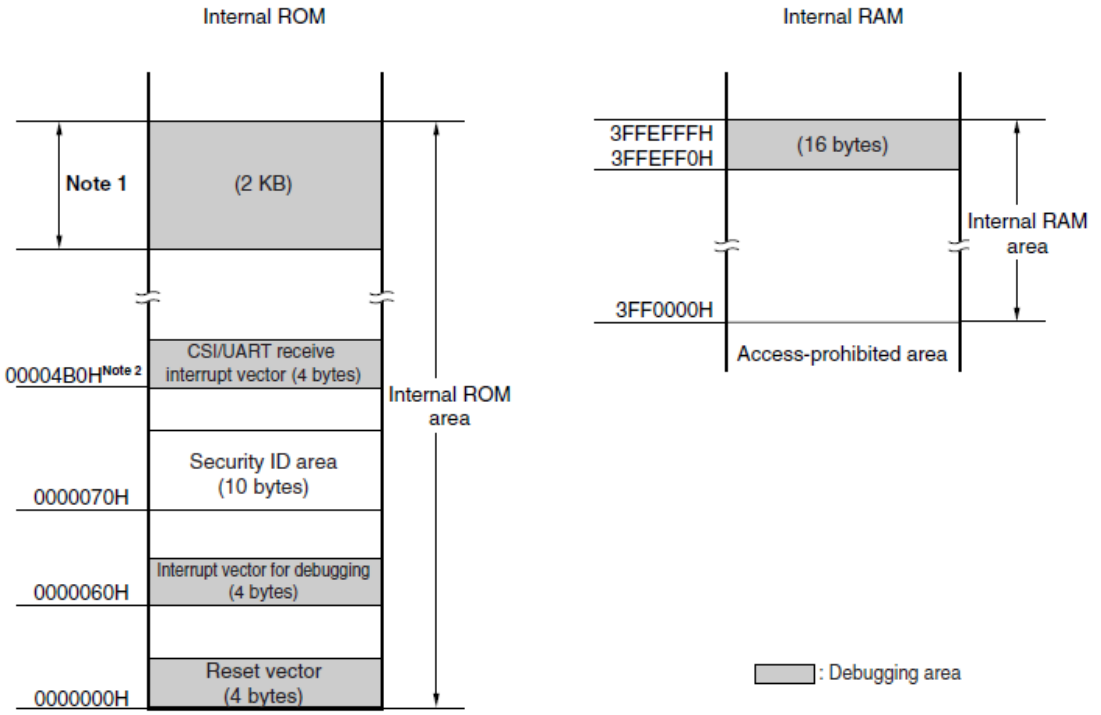
Note: To use the On-Board debug interface, the installation of an update package is needed. This update package can be found in the directory `\MQB2 Monitor Update\` and can be installed by clicking on the installer file `MQB2_monitor_update_v100.exe`, containing the latest Monitor files and Exec-DLL files.

This update package is also needed when the MINICUBE2 is used for on-chip debug through the FP1 connector (which is not assembled).

4.1.1 Resources used by On-Board OCD Interface

Debugging via the On-board OCD Interface uses the user memory spaces to implement communication with the target device, or each debug functions. Refer to the following descriptions and secure these spaces in the user program. For more information about the On-Chip Debug Function please refer to the hardware user's manual of the uPD70F3783.

- Addresses 0x00000060 – 0x00000063: Interrupt vector of debug monitor
  This area is automatically reserved.
  It is not allowed to use this area for any application segment.
- Addresses 0x000004F0 - 0x000004F3: Interrupt vector of UARTC0
  UARTC0 is used for the communication with the debugger and must be reserved
  It is not allowed to use this area for any application segment.
- Addresses 0x00000070-0x00000079 Security ID
  The security ID must be defined to configure the OCD Interface.
  Details are described in the uPD70F3783 user's manual.
- Addresses 0x0007F800 – 0x0007FFFF: 2K Debug Monitor area (ROM)
  This area must be reserved in the linker control file (*.xcl).
  It is not allowed to use this area for any application segment.
- Addresses 0x03FFEFF0 – 0x03FFEFFF: 16 Bytes Debug Monitor area (RAM)
  This area must be reserved in the linker control file (*.xcl).
  It is not allowed to use this area for any application segment.



Notes 1. Address values vary depending on the product.

	Internal ROM Size	Address Value
μPD70F3778	256 KB	003F800H to 003FFFFH
μPD70F3779, 70F3781	384 KB	005F800H to 005FFFFH
μPD70F3780, 70F3782, 70F3783, 70F3784, 70F3785, 70F3786,	512 KB	007F800H to 007FFFFH

2. This is the address when CSIF0 is used. It starts at 0000510H when CSIF3 is used, and at 00004F0H when UARTC0 is used.

Figure 9: V850 OCD Interface Resources

4.2 OCD via N-Wire emulator

To operate the *V850ES/Jx3-E - Network it!* board together with an N-Wire On-Chip debug emulator, e.g. QB-V850MINI, connected to NWIRE1, configure switch SW1 bits1-4 as following:

SW1/bit	Configuration
1	OFF
2	OFF
3	OFF
4	ON

Table 9: OCD via QB-V850MINI Emulator

4.3 OCD via MINICUBE2 On-Chip debugger

To operate the *V850ES/Jx3-E - Network it!* board together with the MINICUBE2 On-Chip debugger, connected to FP1 (not assembled), configure switch SW1 bits1-4 as following:

SW1/bit	Configuration
1	OFF
2	ON
3	ON
4	ON

Table 10: OCD via MINICUBE2 Emulator

Note: To use the MINICUBE2 On-Chip debugger, the installation of an update package is needed. This update package can be found in the directory `\MQB2 Monitor Update\` and can be installed by clicking on the installer file `MQB2_monitor_update_v100.exe`, containing the latest Monitor files and Exec-DLL files.

5. *V850ES/Jx3-E - Network it!* Installation and Operation

5.1 Getting started

The IAR Embedded Workbench including the C-SPY debugger allows building and downloading application programs to the *V850ES/Jx3-E - Network it!* starter kit. As communication interface between the PC host system and the *V850ES/Jx3-E - Network it!* board a standard USB interface line is needed. Before you can download and run a program, software and hardware have to be installed properly.

5.1.1 CD-ROM contents

The CD-ROM shows following directory structure:

V850ES/Jx3-E - Network it!	CD-ROM ROOT
Acrobat	- Acrobat Reader for 32Bit Windows OS
Device File Package	- Device File Package for V850ES/Jx3-E
Documentation	- Documentation
Driver	- USB Driver
IAR	- IAR Embedded Workbench for V850 (64KB code limited)
MQB2 Monitor Update	- Update package with the latest Monitor and Exec-DLL files needed for on-chip debug via the on-board debug interface and MINICUBE2
Sample Programs	- Ethernet sample programs for V850ES/Jx3-E - Network it! *including:* o *HTTP web server demo* o *SMTP/POP3 e-mail client demo* o *DHCP client demo* o *7-segment LED control demo*
Segger	- *Segger USB and Ethernet Eval Package*
WriteEZ5	- Flash Programmer WriteEZ5 incl. PRM files for uPD70F3783

Table 11: *V850ES/Jx3-E - Network it!* CD-ROM Directory Structure

6. Hardware Installation

After unpacking *V850ES/Jx3-E - Network it!,* connect the board via connector USB1 to your host computer using the provided USB interface cable. When *V850ES/Jx3-E - Network it!* is connected, the USB driver needs to be installed on the host machine. Please refer to the following chapter 7.5 USB Driver Installation.

7. Software Installation

The *V850ES/Jx3-E - Network it!* package comes with the following software packages:

- IAR Systems Embedded Workbench for V850, including C compiler, assembler, linker, librarian and IAR C-SPY debugger / simulator
- NEC Ethernet Sample Programs
- Segger USB and Ethernet Eval Package
- WriteEZ5 Flash Programmer Software including the PRM file for µPD70F3783

The IAR Systems Embedded Workbench must be installed on your PC. For detailed installation hints, refer to the following chapters and to the corresponding documentation of the IAR Embedded Workbench.

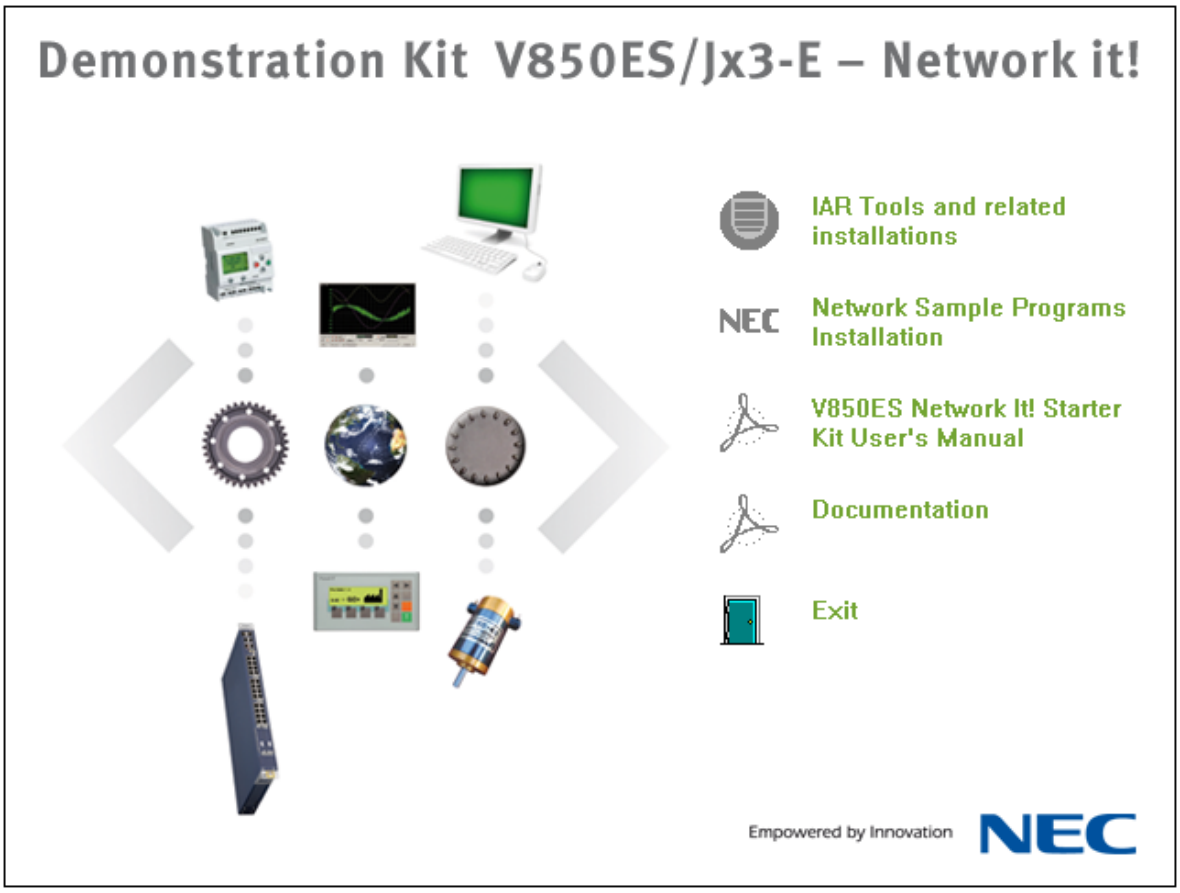


Figure 10: V850ES/Jx3-E – Network it! CDROM autorun.exe

7.1 IAR Systems Embedded Workbench for V850 installation

To install the IAR Systems Embedded Workbench for V850 including C-SPY debugger / simulator, select the `AUTORUN` program in the directory `\IAR\` of the CDROM. The setup dialogues will guide you through the installation process.

7.2 Device File Package installation

To use the IAR Embedded Workbench for V850 together with the uPD70F3783, you have to install the latest device files. You will find the installer for the Device file package on the *V850ES/Jx3-E - Network it!* CD. Select the file `Setup_V850ES-Jx3-E_V1.00.exe` in the directory `\Device File Package\`. The setup dialogues will guide you through the installation process.

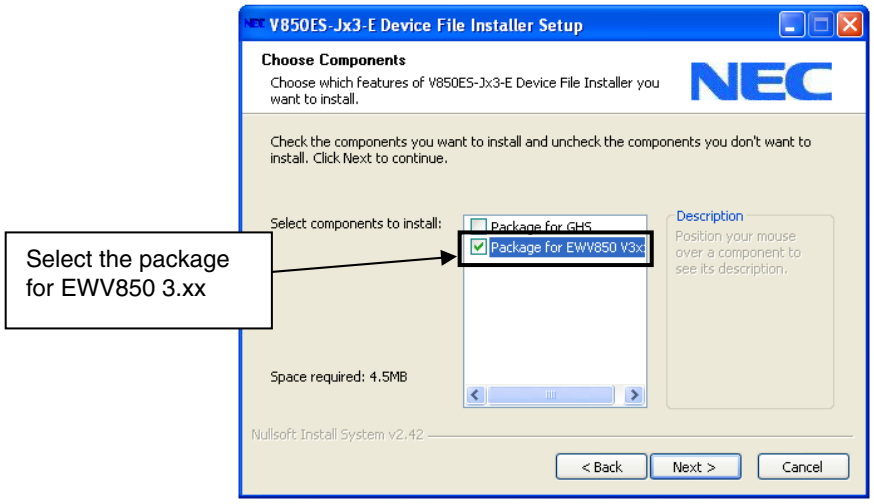

V850ES-Jx3-E Device File Installer Setup
Choose Components
Choose which features of V850ES-Jx3-E Device File Installer you want to install.
NEC
Check the components you want to install and uncheck the components you don't want to install. Click Next to continue.
Select components to install:
Package for GHS
Package for EWV850 V3x
Description
Position your mouse over a component to see its description.
Space required: 4.5MB
Nullsoft Install System v2.42
< Back
Next >
Cancel
Select the package for EWV850 3.xx

Figure 11: Device File Installation

7.3 Sample program installation

To install the Ethernet sample programs for the *V850ES/Jx3-E - Network it!* board copy the full `\Sample Programs\` directory of the CD-ROM on your PC.

7.4 Segger USB and Ethernet Eval Package installation

To install the Segger USB Eval Package for the *V850ES/Jx3-E - Network it!* board select the `SeggerEval_V850ES_NETWORKIT.exe` in the directory `\Segger\` on the CDROM. The setup dialogues will guide you through the installation process. After the installation you will find a detailed documentation of the Segger USB Eval Package in the installation directory.

7.5 USB Driver installation

In order to use the *V850ES/Jx3-E - Network it! board* for On-Chip debugging the USB driver needs to be installed on the host machine. Install the driver according to the following procedure:

Installation on Windows 2000 ..... Page 29
Installation on Windows XP ..... Page 32

Note: The USB driver is part of the IAR Embedded Workbench software package. Therefore please install the IAR Embedded Workbench first.

7.5.1 Installation on Windows 2000

1. When the *V850ES/Jx3-E - Network it!* board is connected with the host machine, the board is recognized by <Plug and Play>, and the wizard for finding new hardware is started. Click Next>.

Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
This wizard helps you install a device driver for a hardware device.
Click.
To continue, click Next.
< Back
Next >
Cancel

Figure 12: Found New Hardware Wizard (Windows 2000)

2. Following the window below is displayed. So, check that "Search for a suitable driver ..." is selected, then click Next>.

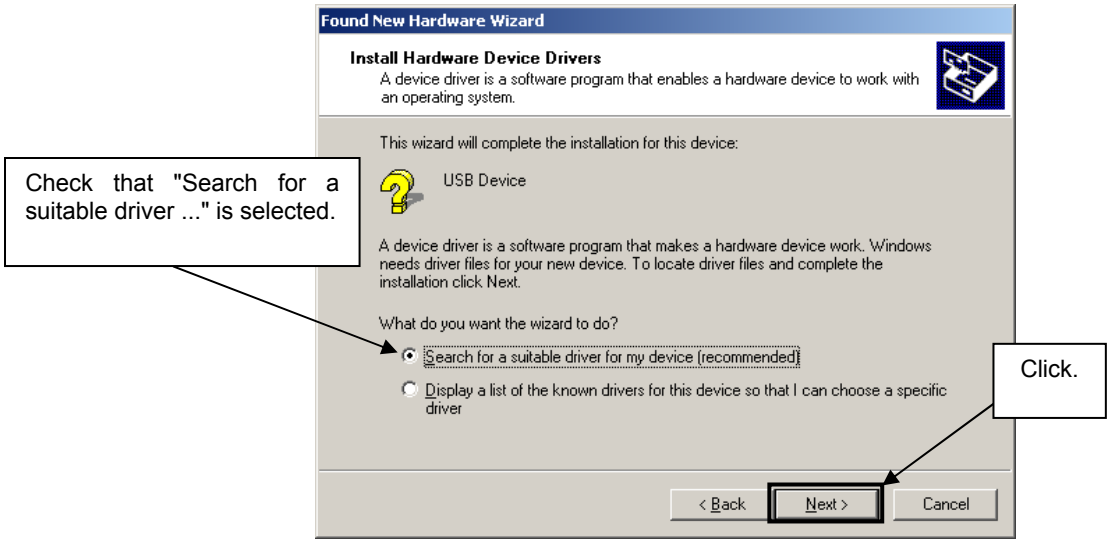

Found New Hardware Wizard
Install Hardware Device Drivers
A device driver is a software program that enables a hardware device to work with an operating system.
This wizard will complete the installation for this device:
USB Device
A device driver is a software program that makes a hardware device work. Windows needs driver files for your new device. To locate driver files and complete the installation click Next.
What do you want the wizard to do?
Search for a suitable driver for my device (recommended)
Display a list of the known drivers for this device so that I can choose a specific driver
< Back
Next >
Cancel
Check that "Search for a suitable driver ..." is selected.
Click.

Figure 13: Search Method (Windows 2000)

3. Check the "Specify a location" check box only, then click Next>.

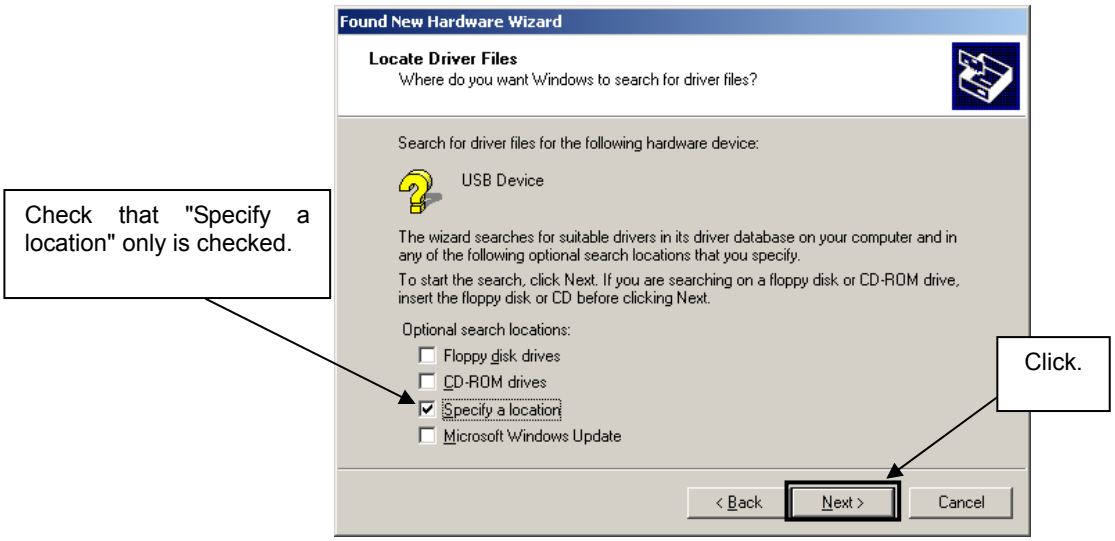

Found New Hardware Wizard
Locate Driver Files
Where do you want Windows to search for driver files?
Search for driver files for the following hardware device:
USB Device
The wizard searches for suitable drivers in its driver database on your computer and in any of the following optional search locations that you specify.
To start the search, click Next. If you are searching on a floppy disk or CD-ROM drive, insert the floppy disk or CD before clicking Next.
Optional search locations:
Floppy disk drives
CD-ROM drives
Specify a location
Microsoft Windows Update
< Back
Next >
Cancel
Check that "Specify a location" only is checked.
Click.

Figure 14: Driver File Location (Windows 2000)

4. Locate the folder " \Driver" on the CD-ROM.

5. The setup information file "MQB2SALL.inf" is automatic selected, then click Open to proceed within driver installation.

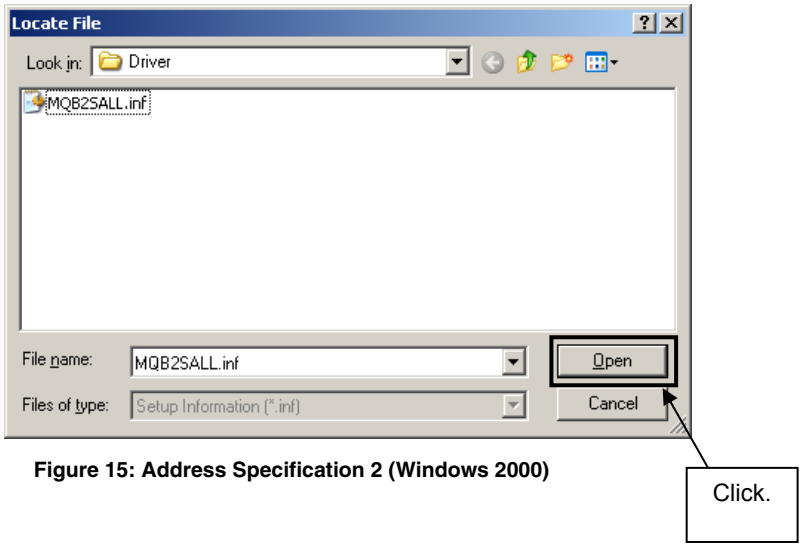


Figure 15: Address Specification 2 (Windows 2000)

6. After the location of the USB driver has been specified click OK to proceed.

5. Click Next>.

Found New Hardware Wizard
Driver Files Search Results
The wizard has finished searching for driver files for your hardware device.
The wizard found a driver for the following device:
USB Device
Windows found a driver for this device. To install the driver Windows found, click Next.
c:\program files\iar systems\embedded workbench 4.0\78k\config\nec\ie_pc_driver\minicube\mqb2sall.inf
< Back
Next >
Cancel
Click.

Figure 16: Driver File Search (Windows 2000)

6. Click Finish to complete the installation of the USB driver.

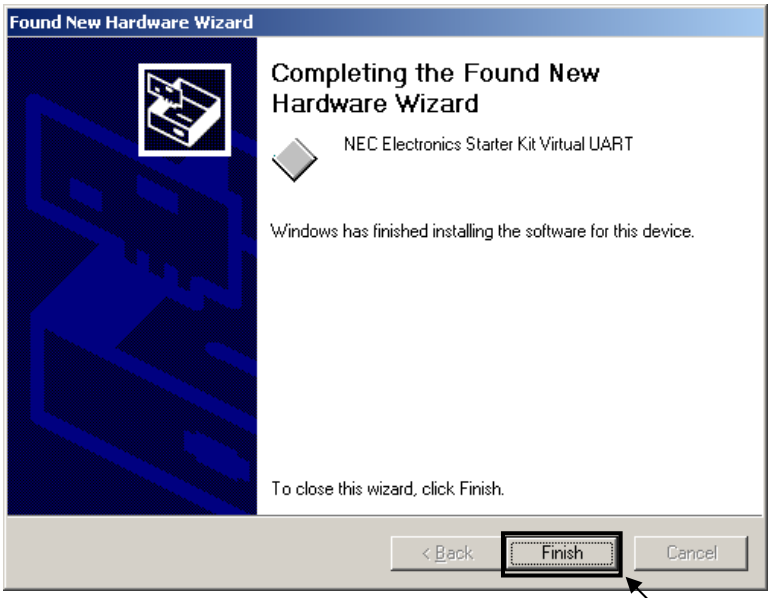

Found New Hardware Wizard
Completing the Found New Hardware Wizard
NEC Electronics Starter Kit Virtual UART
Windows has finished installing the software for this device.
To close this wizard, click Finish.
< Back
Finish
Cancel
Click.

Figure 17: USB Driver Installation Completion (Windows 2000)

7.5.2 Installation on Windows XP

1. When the *V850ES/Jx3-E - Network it*! board is connected with the host machine, the board is recognized by Plug and Play, and the wizard for finding new hardware is started. At first the hardware wizard will ask if windows should search on the windows update web, check "No, not this time" and then click Next>.

Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
Windows will search for current and updated software by looking on your computer, on the hardware installation CD, or on the Windows Update Web site (with your permission).
Read our privacy policy
Can Windows connect to Windows Update to search for software?
Yes, this time only
Yes, now and every time I connect a device
No, not this time
Click Next to continue.
< Back
Next >
Cancel
Check that "No, not this time" is selected.
Click.

Figure 18: Found New Hardware Wizard 1 (Windows XP)

2. Check that "Install from a list or specific location (Advanced)" is selected, then click Next>.

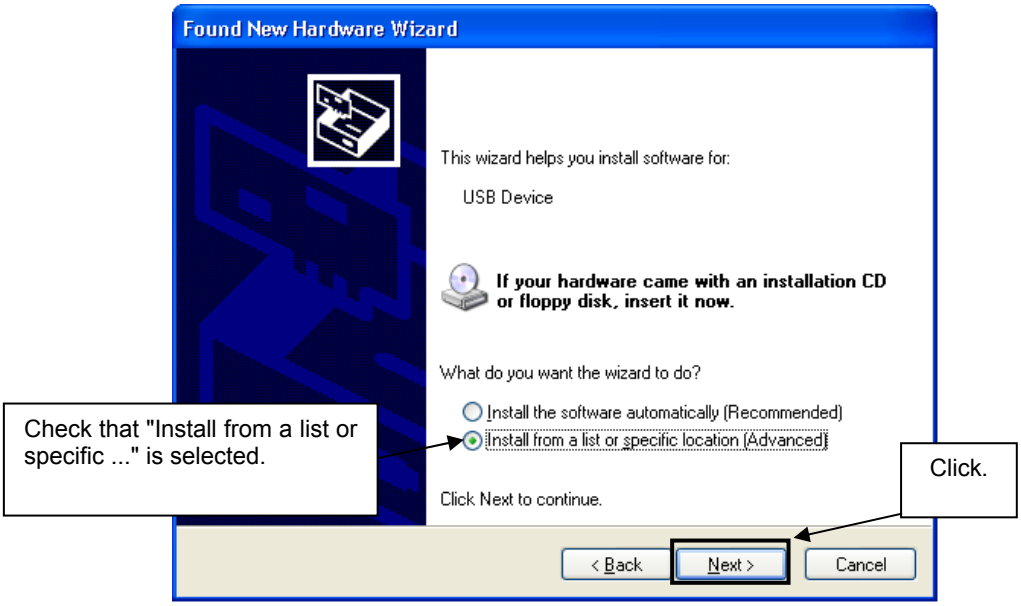

Found New Hardware Wizard
This wizard helps you install software for:
USB Device
If your hardware came with an installation CD or floppy disk, insert it now.
What do you want the wizard to do?
Install the software automatically (Recommended)
Install from a list or specific location (Advanced)
Click Next to continue.
< Back
Next >
Cancel
Check that "Install from a list or specific ..." is selected.
Click.

Figure 19: Found New Hardware Wizard 2 (Windows XP)

3. Check that "Search for the best driver in these locations." is selected. Select the "Include this location in the search:" check box and then click Browse.

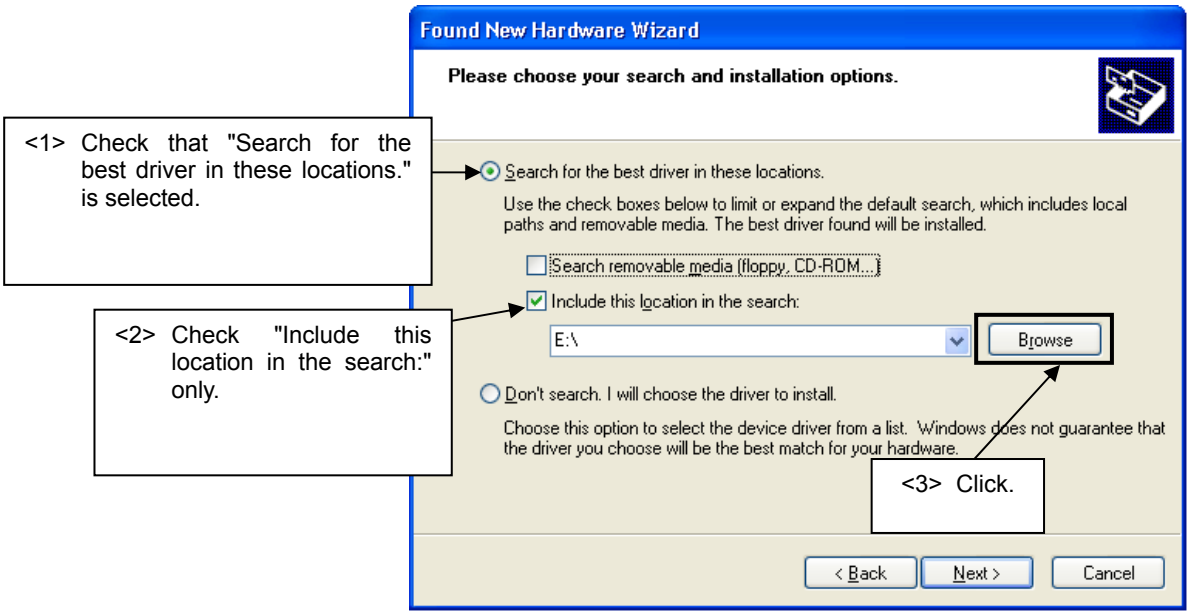

<1> Check that "Search for the best driver in these locations." is selected.
<2> Check "Include this location in the search:" only.
Found New Hardware Wizard
Please choose your search and installation options.
Search for the best driver in these locations.
Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.
Search removable media (floppy, CD-ROM...)
Include this location in the search:
E:\
Browse
Don't search. I will choose the driver to install.
Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.
<3> Click.
< Back
Next >
Cancel

Figure 20: Search Location Specification 1 (Windows XP)

4. Locate the folder "\Driver" on the CD-ROM.

5. After the location of the USB driver has been specified click Next> to continue driver installation.

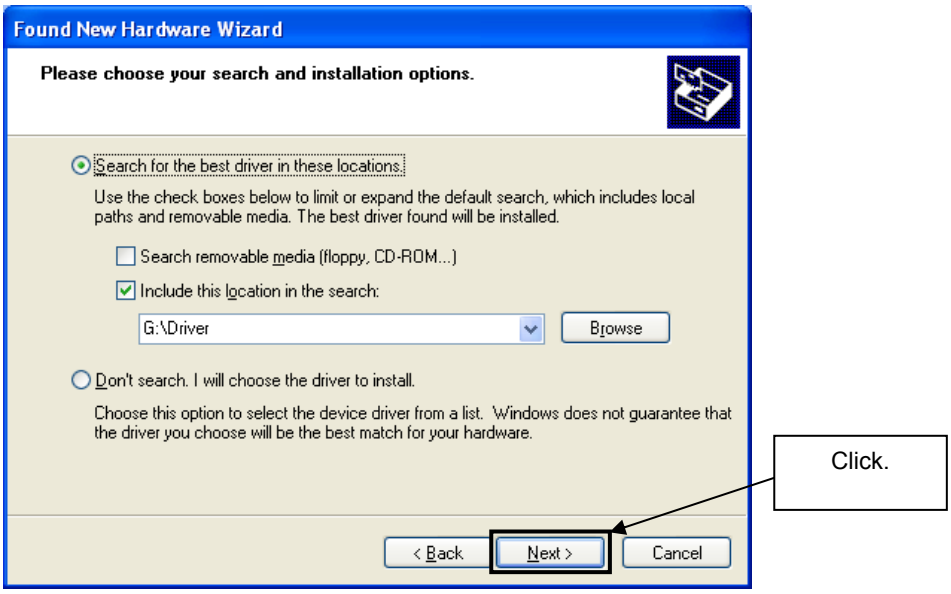

Found New Hardware Wizard
Please choose your search and installation options.
Search for the best driver in these locations.
Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.
Search removable media (floppy, CD-ROM...)
Include this location in the search:
G:\Driver
Browse
Don't search. I will choose the driver to install.
Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.
Click.
< Back
Next >
Cancel

Figure 21: Search Location Specification 2 (Windows XP)

6. As shown below, "NEC Electronics Starter Kit Virtual UART has not passed Windows Logo testing to verify its compatibility with Windows XP." is displayed. Click Continue Anyway.

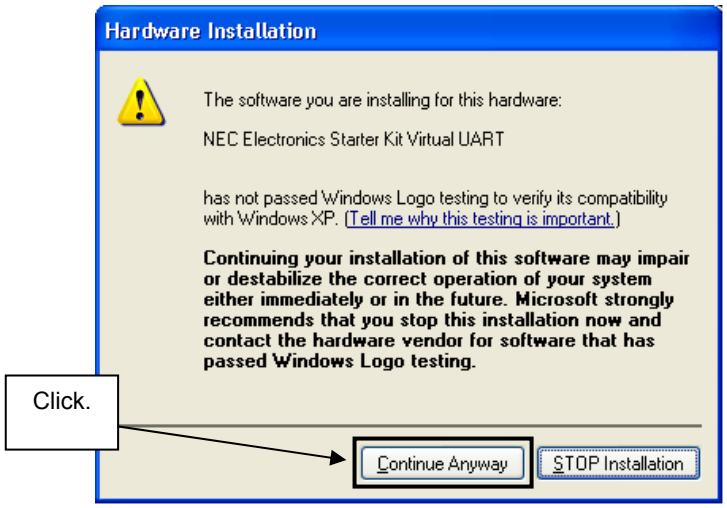

Hardware Installation
The software you are installing for this hardware:
NEC Electronics Starter Kit Virtual UART
has not passed Windows Logo testing to verify its compatibility with Windows XP. (Tell me why this testing is important.)
Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the hardware vendor for software that has passed Windows Logo testing.
Click.
Continue Anyway
STOP Installation

Figure 22: Windows XP Logo Testing (Windows XP)

7. After the installation of the USB driver is completed the window below is displayed. Click Finish to close the hardware wizard.

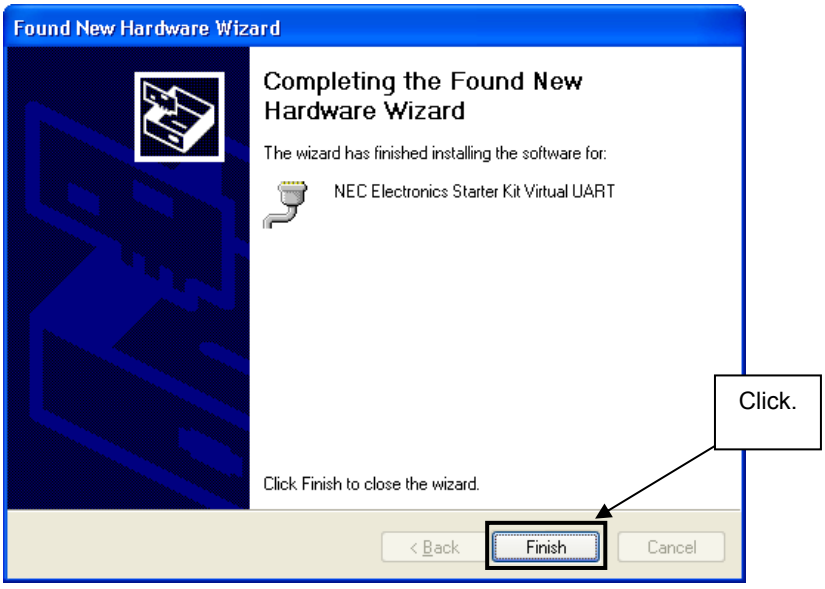


Figure 23: USB Driver Installation Completion (Windows XP)

7.6 Confirmation of USB Driver installation

After installing the USB driver, check that the driver has been installed normally, according to the procedure below. When using the *V850ES/Jx3-E - Network it!* board in combination with IAR C-SPY debugger the “NEC Electronics Starter Kit Virtual UART” should be present like in the figure below.

Please check in the Windows "Device Manager" within the Windows Properties (“Hardware” tab), that the driver is installed normally.

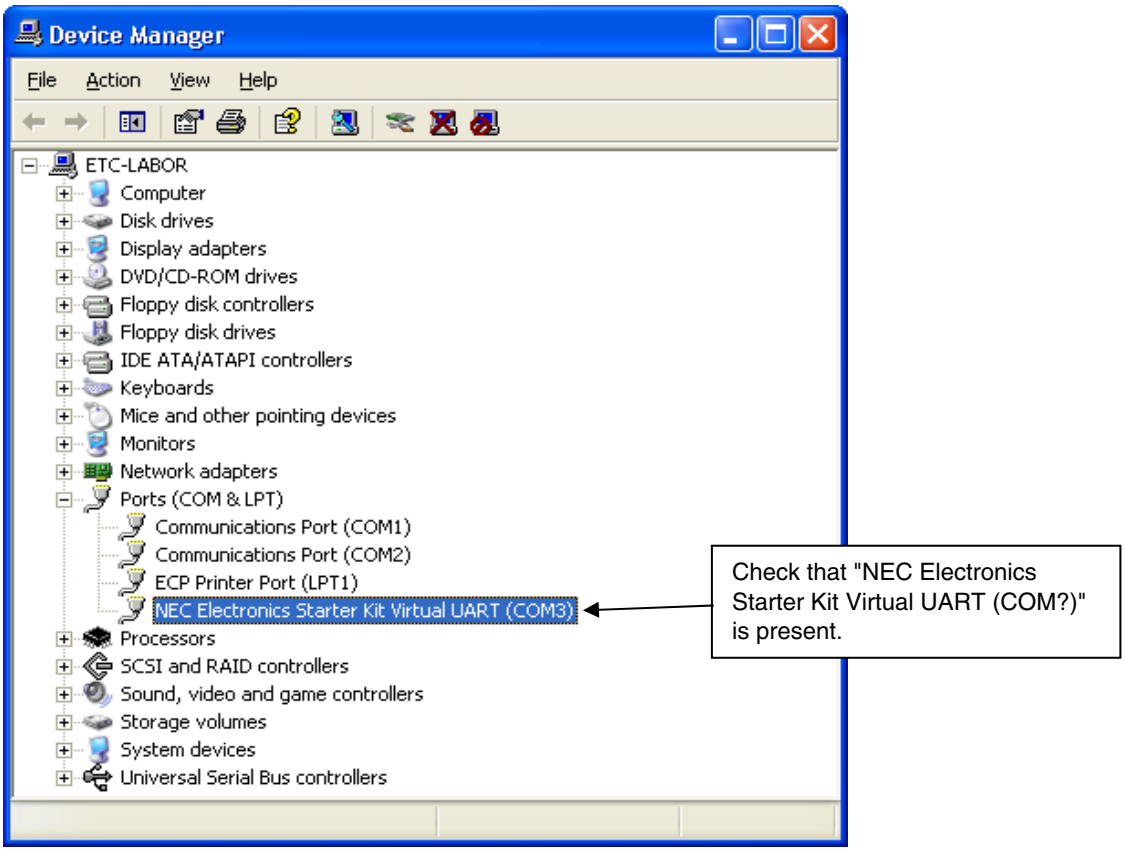


Figure 24: Windows Device Manager

8. IAR Sample Session

When everything is set up correctly the IAR Embedded Workbench can be started. To do so, start the Embedded Workbench from Windows “Start” menu > “Programs” > folder “IAR Systems” > “IAR Embedded Workbench Kickstart for NEC V850”. The following screen appears:

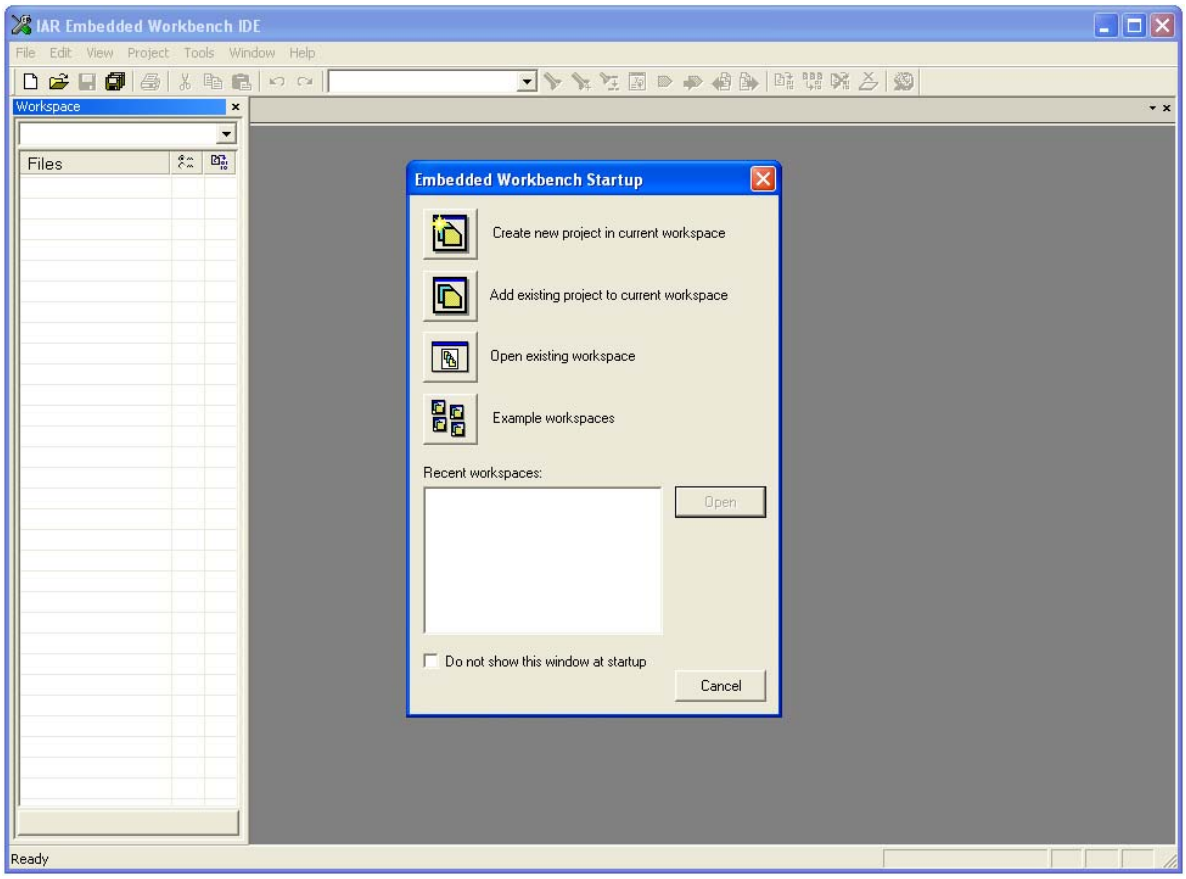


Figure 25: IAR Embedded Workbench

Now select the option “Open existing workspace” from the “File” menu and locate the following sample project folder, `\Sample Programs\TK-850_Jx3-E_IAR_mailSample\Program Files\NEC Electronics Tools\smp850e\cnet\TK-850_Jx3-E\OSless,` and open the file “**cnet.eww**”. This is the workspace file that contains general information about all sample projects and corresponding settings.

After the sample workspace has been opened the structure of the workspace is displayed. The screen should now look similar to this one:

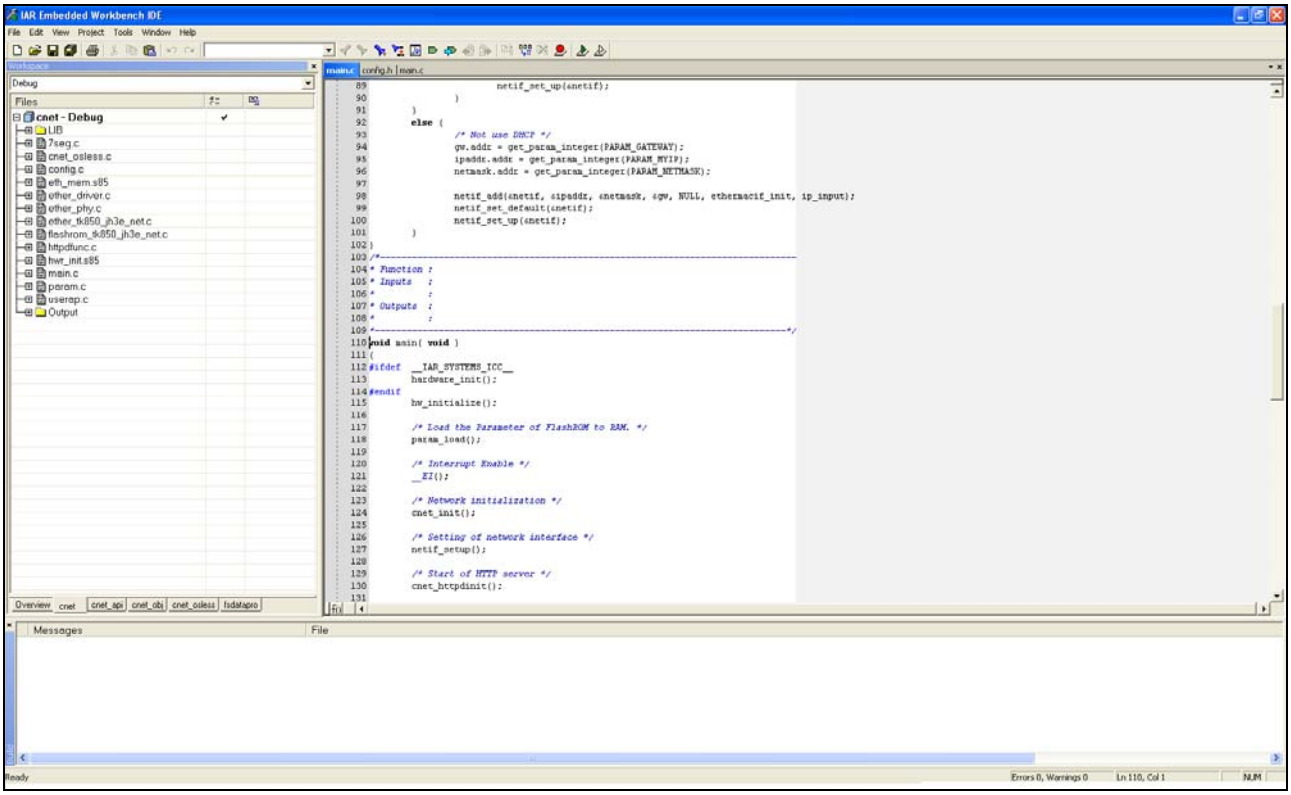


Figure 26: IAR Embedded Workbench Project Workspace

As a next step check some settings of the IAR Embedded Workbench that have to be made for correct operation of the demonstration sample programs and usage of the On-Board debug function of the *V850ES/Jx3-E - Network it!* board. First highlight the project folder called “cnet – Debug” in the workspace window. Then select “Project” > “Options” from the pull-down menus. Go to “General Options” and select the device uPD70F3783 (V850ES → V850ES – Jx3-E → V850ES - uPD70F3783).

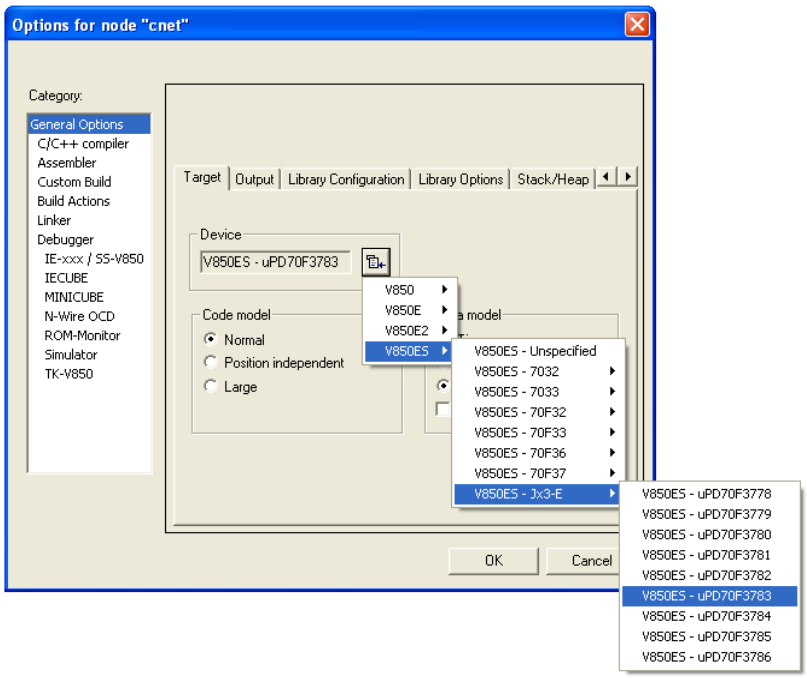


Figure 27: Device Selection

It is necessary to tell the compiler where the additional Header files of the demonstration samples are located. Select the category “C/C++ compiler” and then the tab “Preprocessor”. Now the additional Include path can be added to the field “Additional include directories”.

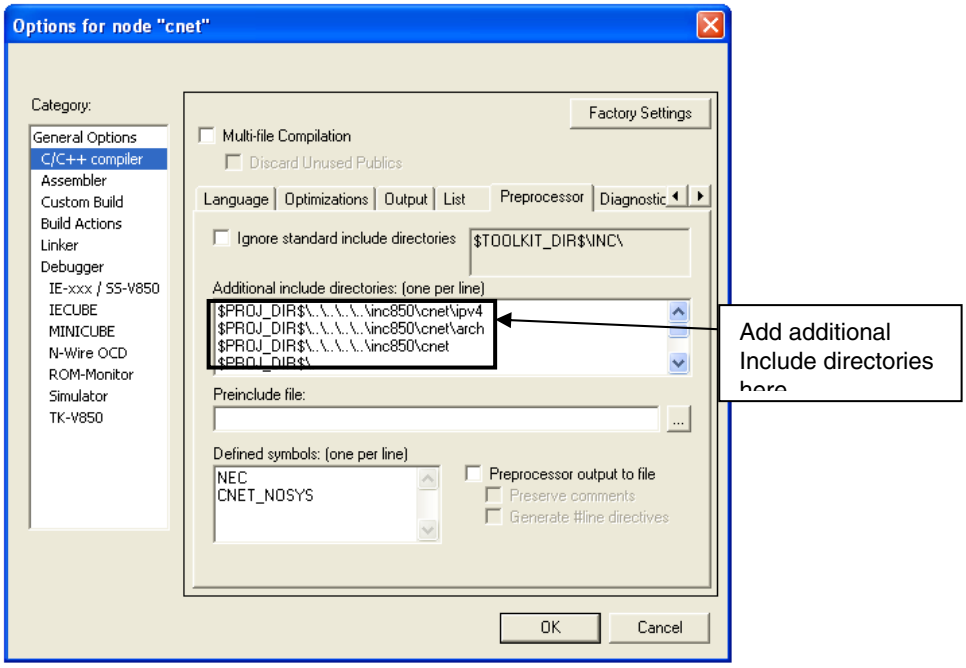


Figure 28: Include Directory

As next step select the category “Debugger”. Make sure that the driver is set to “MINICUBE”. After this select the category “MINICUBE” down below and tick the box “Use MINICUBE2 (MINI2)” in order to use the On-Board debug function of the *V850ES/Jx3-E - Network it!* board.

The corresponding port where the *V850ES/Jx3-E - Network it!* board is connected to the host PC will be detected automatically by the IAR C-SPY debugger.

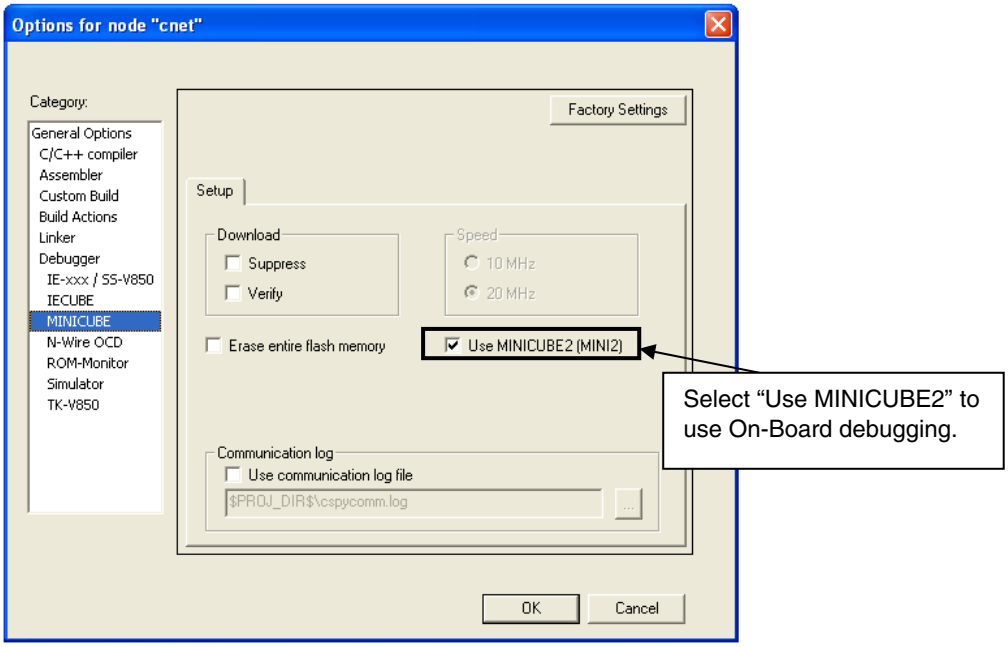


Figure 29: IAR Debugger Options

Note: Although the On-board debug interface is used, the MINICUBE2 C-Spy driver must be selected instead of the standard driver TK-V850 used for other starter kits. If the debug session via MINICUBE (QB-V850MINI) and the N-Wire connector shall be started, the MINICUBE C-Spy driver must be selected.

Next the correct linker settings of the demo project will be checked. This can be done in the “Linker” category as shown below. Select the “Config” tab and check that the linker command file “lnk70F3760.xcl” is selected. This file is used by the linker and contains information on where to place the different sections of code, data and constants that may be used within the demo project:

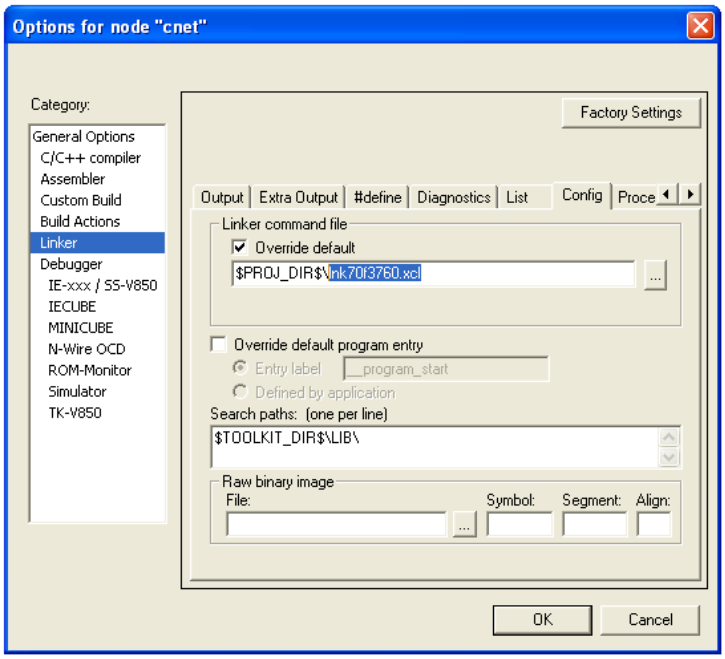


Figure 30: Embedded Workbench Linker Configuration

Now after everything has been setup correctly it’s time to compile and link the demonstration project. Close the Options menu and select “Rebuild All” from the “Project” menu. If the project is compiled and linked without errors or warnings it can now be downloaded to the *V850ES/Jx3-E - Network it!* board and debugged.

To start the IAR C-SPY debugger select the option “Debug” from the “Project” menu or press the ( ) “Debugger” button.

In the next step the Emulator has to be configured before downloading a new application. Press the OK button to enter the emulator hardware setup. Set the configuration as show in the figure below and start the download by pressing the OK button.

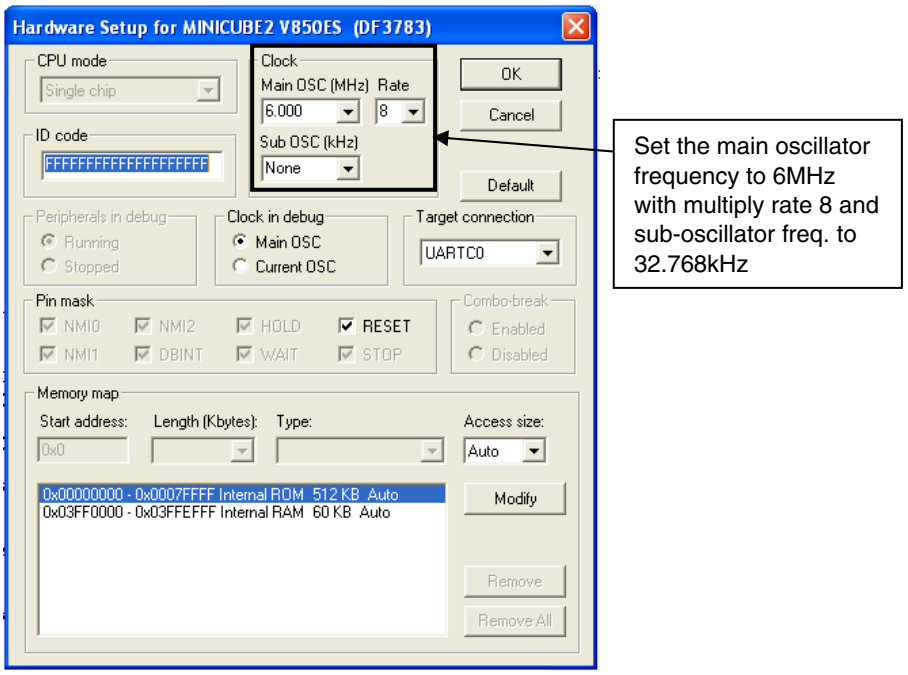


Figure 31: MINICUBE Hardware Setup Dialogue

Now the debugger is started and the demo project is downloaded to the *V850ES/Jx3-E - Network it!* board. The progress of downloading is indicated by a blue bar in the MINICUBE Emulator window. Please note that downloading of larger executables may take some time.

After the download was completed all debug features of IAR C-SPY debugger are available, i.e. Single Stepping, Step Over/-In/-Out, Go-Execution, Breakpoints, Register / Memory view etc.
To run the sample application select the option “Go” from the “Debug” menu or press the ( ) “Go” button.

To get more details on the debugger configuration and capabilities please refer to the “IAR Embedded Workbench IDE User Guide” of the IAR installation.

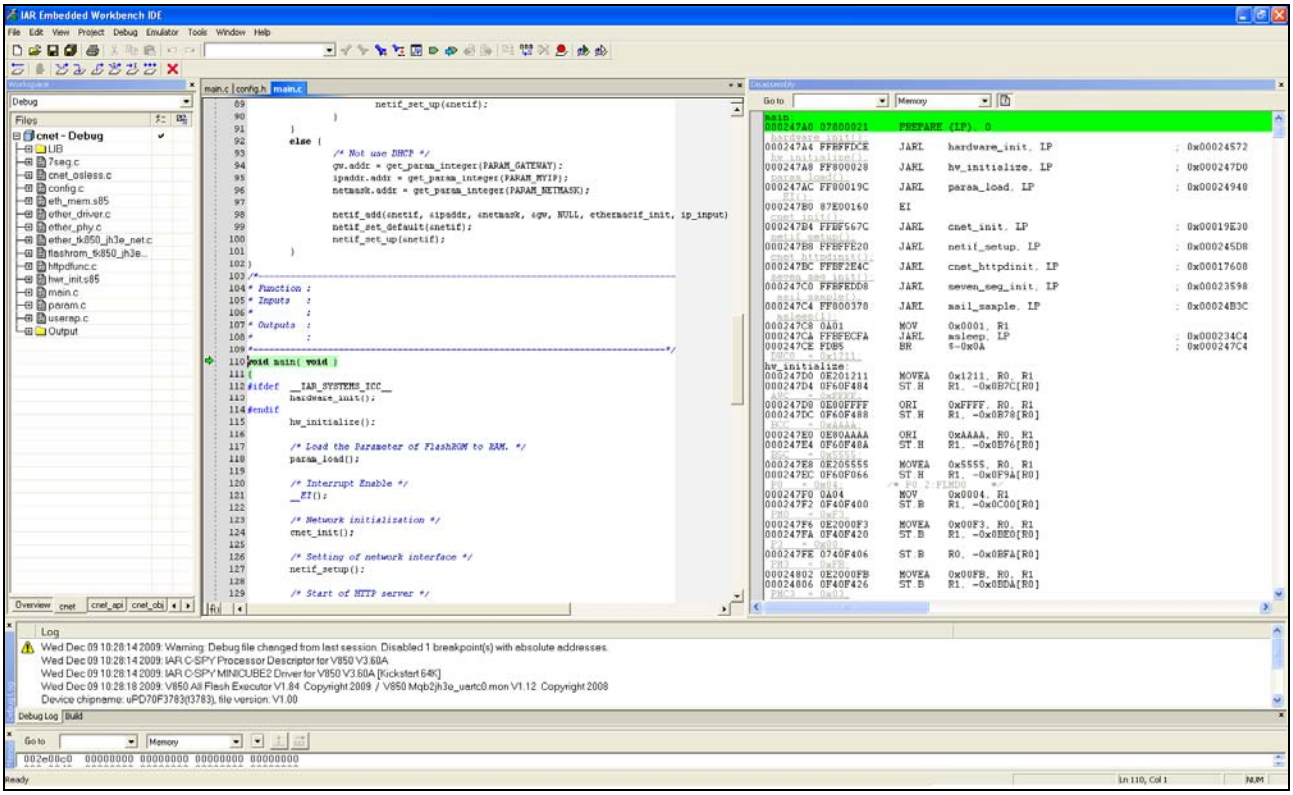


Figure 32: IAR C-SPY Debugger

9. Troubleshooting

In some cases it might happen that the connection to the *V850ES/Jx3-E - Network it!* board can not be established. This can be caused by the following three situations:

- ***Wrong security ID***: The security ID is required to prevent the FLASH memory of the uPD70F3783 microcontroller from being read by an unauthorized person. The security ID is located in the internal flash memory at addresses 0x0070-0x0079 of the uPD70F3783 microcontroller. The IAR C-SPY debugger starts only when the security ID that is set during debugger start-up and the security ID set at addresses 0x0070 to 0x0079 do match. In the above mentioned case it is necessary to erase the internal flash memory of the uPD70F3783 microcontroller to restore the security ID. Details about erasing and programming the internal flash memory of the uPD70F3783 are described in chapter 10 “Flash Programmer WriteEZ5”

- ***Wrong Emulator Driver:*** Make sure that the driver in the category “Debugger” of the project options menu is set to “MINICUBE”. After this select the category “MINICUBE” down below and tick the box “Use MINICUBE2 (MINI2)” in order to use the right driver settings for the *V850ES/Jx3-E - Network it!* board.

- ***Wrong Oscillator Frequency:*** Make sure that the clock settings in the Emulator Hardware Setup fit to the used oscillators on the board. In case of *V850ES/Jx3-E - Network it!* the main oscillator frequency is 6 MHz with multiply rate 8. The sub-oscillator frequency is 32.768 kHz.

10. Flash Programmer WriteEZ5

The Flash programmer WriteEZ5 doesn't need to be installed, but can be directly started from the CD-ROM. The Hex file, `web_server_no_DHCP_192_168_0_5.hex`, contains the sample programs and is provided in the `\Sample Programs\` directory of the CD-ROM. The file is ready to be programmed to the Flash memory of the uPD70F3783 device after loading it using the "Load" button.

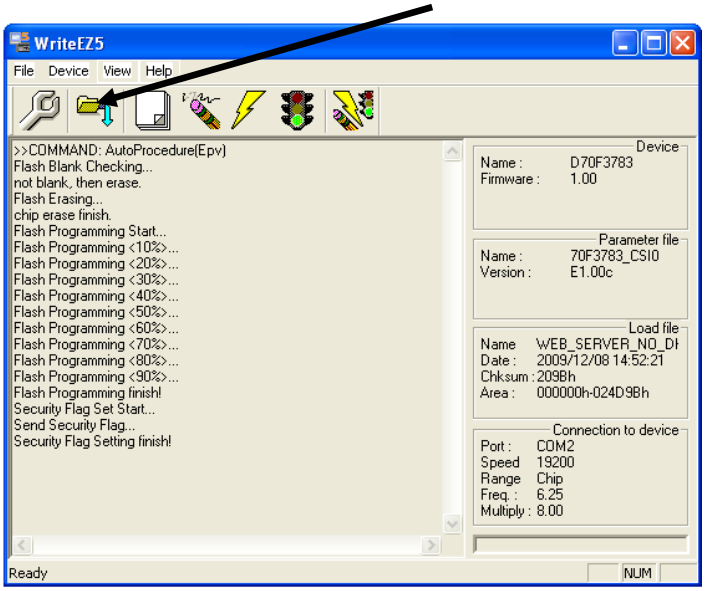


Figure 33: WriteEZ5 User Interface

10.1 Device Setup

To provide all necessary information about the device to be programmed, only the corresponding flash parameter file must be loaded. The parameter file (*.prm) for the uPD70F3783 is located on the CD-ROM in the folder `\WriteEZ5\PRM-70F3786_E100C\`. Please use the menu "Device -> Setup…" to open the following dialogue and the button "PRM File Read" to select the parameter file. Select the file 70F3783_CSI0.prm.

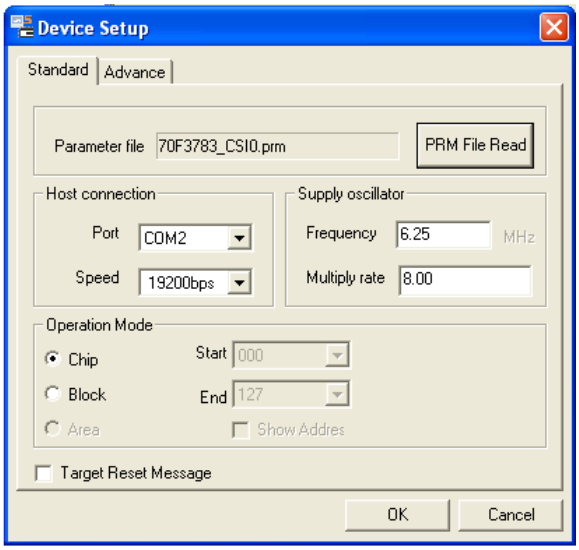


Figure 34: WriteEZ5 Device Setup Dialogue

Please check that the correct host communication port is selected. The used communication port can be seen in the Windows Device Manager.

10.2 Using WriteEZ5

After a successful device selection the internal flash memory can be blank-checked, erased, programmed or verified. WriteEZ5 can be controlled either by menu or by buttons

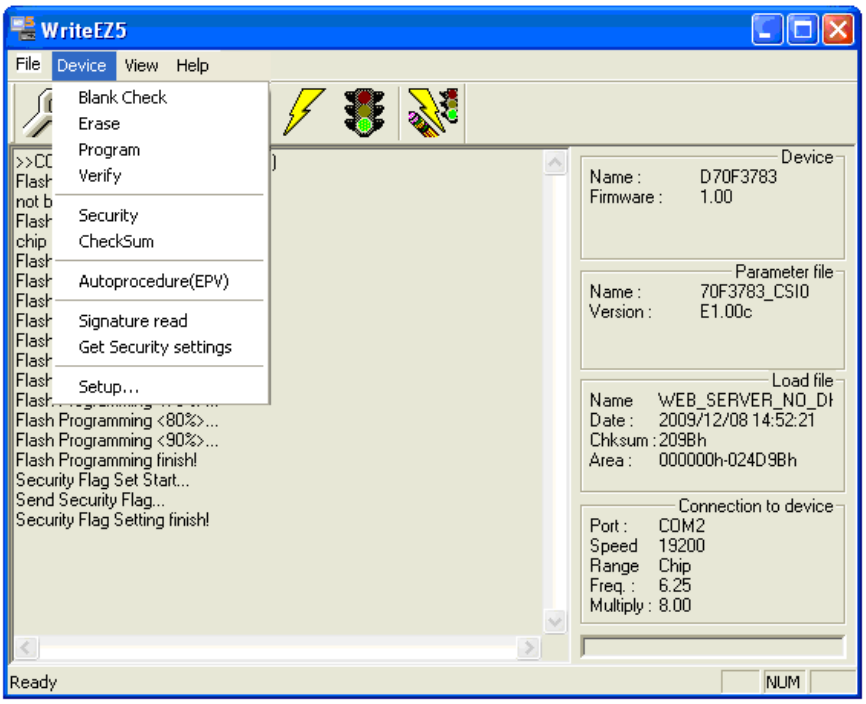


Figure 35: WriteEZ5 Device Menu

	device setup button
	load file button
	blank check button
	erase button
	program button
	verity button
	erase / program / verify button

Table 12: WriteEZ5 Action Buttons

WriteEZ5 supports Intel-Hex and Motorola S-record file formats as input file.

11. Ethernet Sample Programs

11.1 General introduction

All Ethernet sample programs are located in a single source code which can be found in the following directory of the CD-ROM:
`\Sample Programs\TK-850_Jx3-E_IAR_mailSample\Program Files\NEC Electronics Tools\smp850e\cnet\TK-850_Jx3-E\OSless`

This directory of the sample programs contains the project including all output files of the development tool. The workspace file "**cnet.eww**" is located in this directory and includes the project from which all the sample programs can be run.

As an alternative to open the sample-workspace project file "<name>.ewp" can be added to any user created workspace.

The source code of the sample programs uses the following directory structure:

fs	Web server contents
include	C header files
OSless	Demonstration sample project directory
Debug	Debug output files for IAR C-SPY debugger
Release	Output files for Flash programming purpose
settings	Configuration files, IAR Embedded Workbench
cnet.dep	Dependency information file, IAR Embedded Workbench
cnet.ewd	Project setting file, IAR C-SPY debugger
cnet.ewp	Project file, IAR Embedded Workbench
cnet.eww	Workspace file, IAR Embedded Workbench
io70f3760.ddf	DDF file
io70f3760.sfr	SFR file
lnk70f3760.xcl	Linker control file
src	C source files

Table 13: Sample Directory Structure

The `\OSless` directory contains the project files for the IAR Systems Embedded Workbench for NEC V850 as well as the device definition, SFR and linker control files of the uPD70F3783 device. All source files are located in the directory `\src`. The `\include` directory contains the header files. All output files including the object files, list files, debug information and finally the executable file are stored in the directory `\Debug` or `\Release`.

For details of using the IAR Embedded Workbench and the IAR C-SPY debugger please refer to the "V850 IAR Embedded Workbench IDE User Guide".

11.2 Sample Programs overview

The Ethernet sample programs consist of a HTTP web server, which is used to configure a POP3/SMTP e-mail client and to control a 7-segment LED, and a DHCP client.

To operate these sample programs, the *V850ES/Jx3-E - Network it!* board must be connected to the Ethernet port of a PC. The connection is detailed in the next section.

Ethernet Samples Programs	
Web server	A HTTP web server running with a web browser is used to configure the settings of the e-mail sample applications and to control the on-board 7-segment LED
E-mail client	POP3/SMTP protocols are used to demonstrate e-mail functionality
DHCP client	DHCP protocol is used for dynamic IP address allocation
7-Seg. LED	7-Seg. LED which is mounted on the *V850ES/Jx3-E - Network it!* board

Table 14: Ethernet Sample Programs Description

The sample programs can be used according to the following procedure:

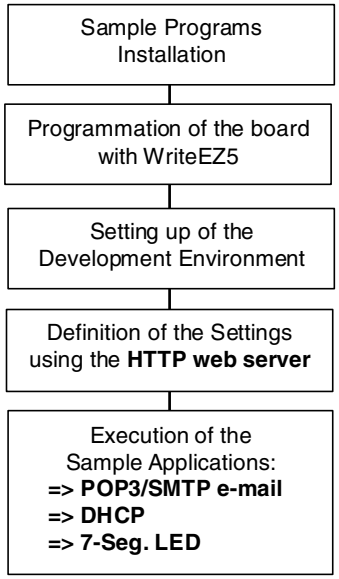

Sample Programs Installation
Programmation of the board with WriteEZ5
Setting up of the Development Environment
Definition of the Settings using the HTTP web server
Execution of the Sample Applications:
=> POP3/SMTP e-mail
=> DHCP
=> 7-Seg. LED

Figure 36: Sample Programs Procedure

Once you have programmed the *V850ES/Jx3-E - Network it!* board with the sample programs provided in the hex file (`web_server_no_DHCP_192_168_0_5.hex`) using WriteEZ5, please refer to the next sections to find out how to launch and use them.

11.3 HTTP web server

11.3.1 Development environment

Prior to use the HTTP web server sample program, the development environment must be set according to the following points.

1. Use the settings displayed in the tables below for the switch SW1 and the power supply jumper JP1 of the *V850ES/Jx3-E - Network it!* board.

SW1 / bit	Configuration: Stand alone mode
1	OFF
2	OFF
3	OFF
4	ON

JP1	Power Supply Source
1-2 short	USB connector USB1

Note: Use these same settings for SW1 and JP1 for every sample program. Optionally, you can supply the board using an external power supply plugged in the connector CN4. In that case you need to move the jumper JP1 on the 5-6 position.

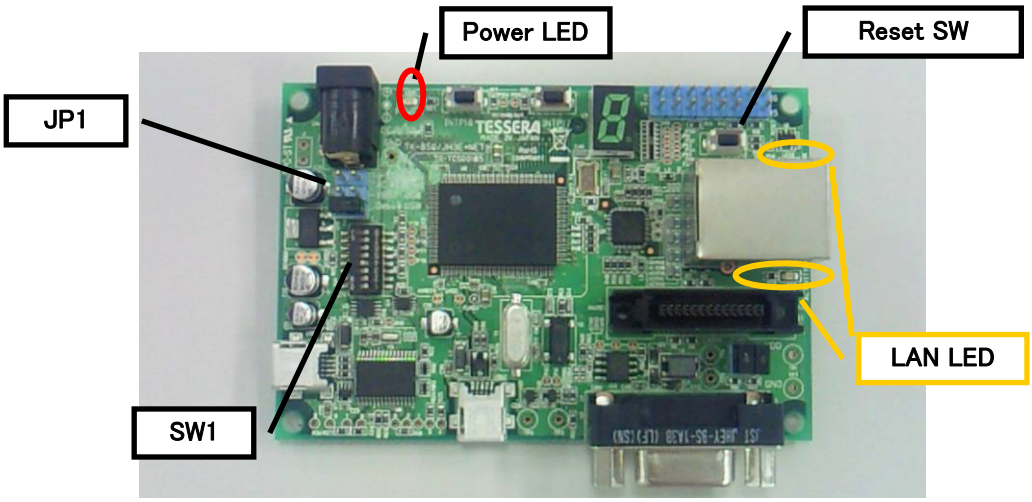


Figure 37: Location of Switches and LEDs

2. Plug the Ethernet RJ45 cable (category 5) between the Ethernet connector of the *V850ES/Jx3-E - Network it!* board and the Ethernet port of the host PC. Please use an RJ45 cross cable when connecting the board directly to the host PC.

3. Connect the USB cable to the *V850ES/Jx3-E - Network it!* board. The power is applied to the microcontroller as soon as the USB cable is plugged, there is no power switch.

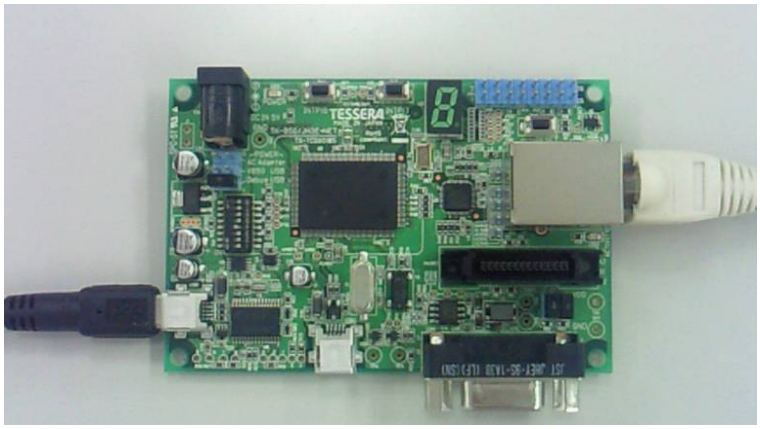


Figure 38: *V850ES/Jx3-E - Network it!* Board Connected

11.3.2 How to run the sample program

After having connected the host PC to the *V850ES/Jx3-E - Network it!* board and having open the HTTP web server via a web browser, this HTTP web server can then be used to see or setup the parameters of the network. To do so, please follow the instructions below:

1. The program is automatically booted and the HTTP web server starts as soon as the power supply is applied to the board.

2. On you host PC, open the Windows “Start” menu > “Connect to” > “Show all connections”, then do a right click on your network connection and select “Properties”. Under the General tab, select “Internet Protocol TCP/IP” and click on the “Properties” button. From the displayed window, select “Use the following IP address”, enter the following settings and click OK:

   IP Address: 192.168.0.10
   Subnet mask: 255.255.255.0

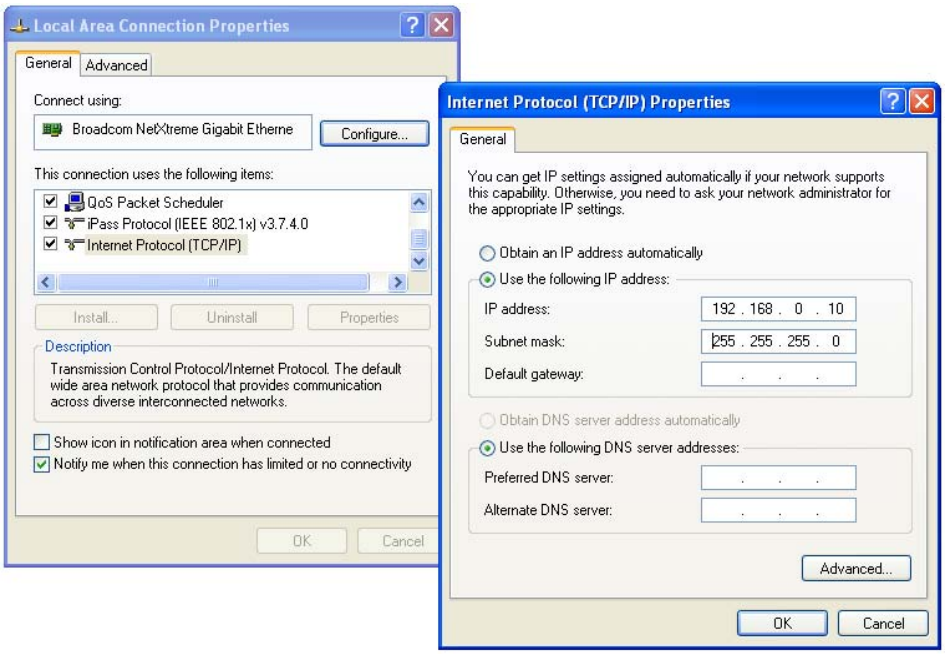

Local Area Connection Properties
General
Advanced
Connect using:
Broadcom NetXtreme Gigabit Etherne
Configure...
This connection uses the following items:
QoS Packet Scheduler
iPass Protocol (IEEE 802.1x) v3.7.4.0
Internet Protocol (TCP/IP)
Install...
Uninstall
Properties
Description
Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.
Show icon in notification area when connected
Notify me when this connection has limited or no connectivity
OK
Cancel
Internet Protocol (TCP/IP) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
192 . 168 . 0 . 10
Subnet mask:
255 . 255 . 255 . 0
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Advanced...
OK
Cancel

Figure 39: Host PC IP Address Configuration

3. Open your favorite web browser on the host PC, and type the following address in the URL bar to connect to the HTTP web server of the *V850ES/Jx3-E - Network it!* board:
   http://192.168.0.5

Note: The IP address of the board can be changed in the “config.h” header file located on the \include directory of the sample programs. The variable to modify is “CONFIG_MY_IPADDRESS”.
The MAC address has to be written to address 0x0007FFF8 of the internal Flash (see \src\driver\ether_tk850_jh3e_net.c).

4. The main page of the HTTP web server will be displayed:

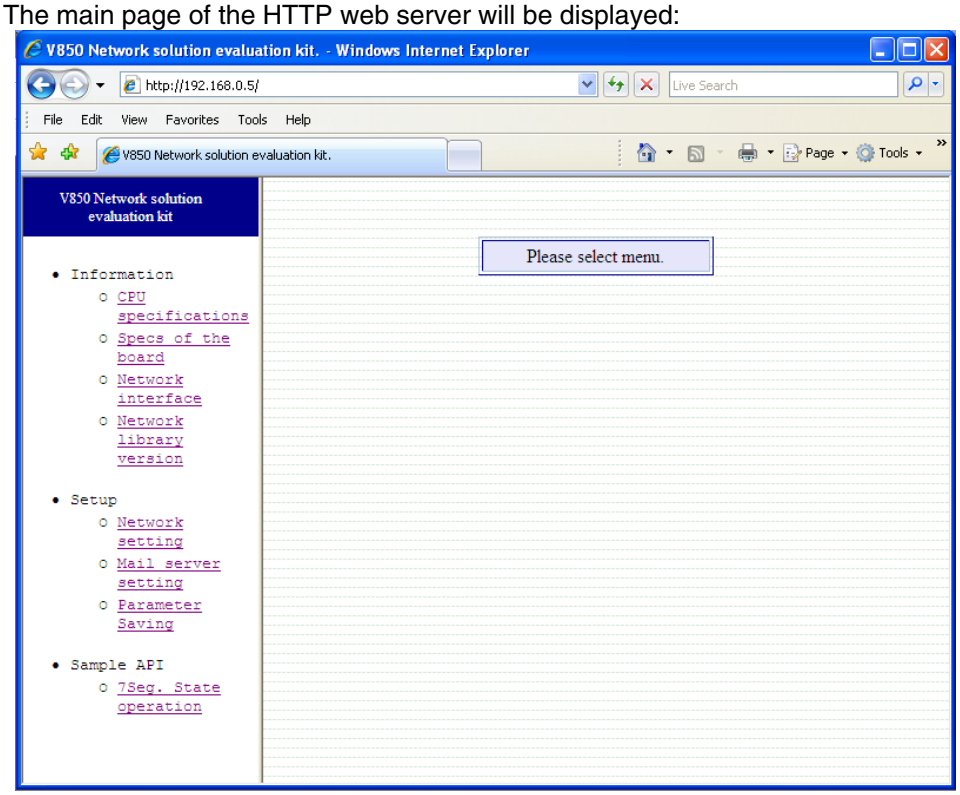


Figure 40: HTTP Web Server Main Page

5. The available menu is split into three main sections, which are *Information*, *Setup* and *Sample API.*

   In the *Information* section, in addition of the CPU specifications and the board specifications, you can also access the Network interface subsection. This subsection displays the actual settings of your network configuration:

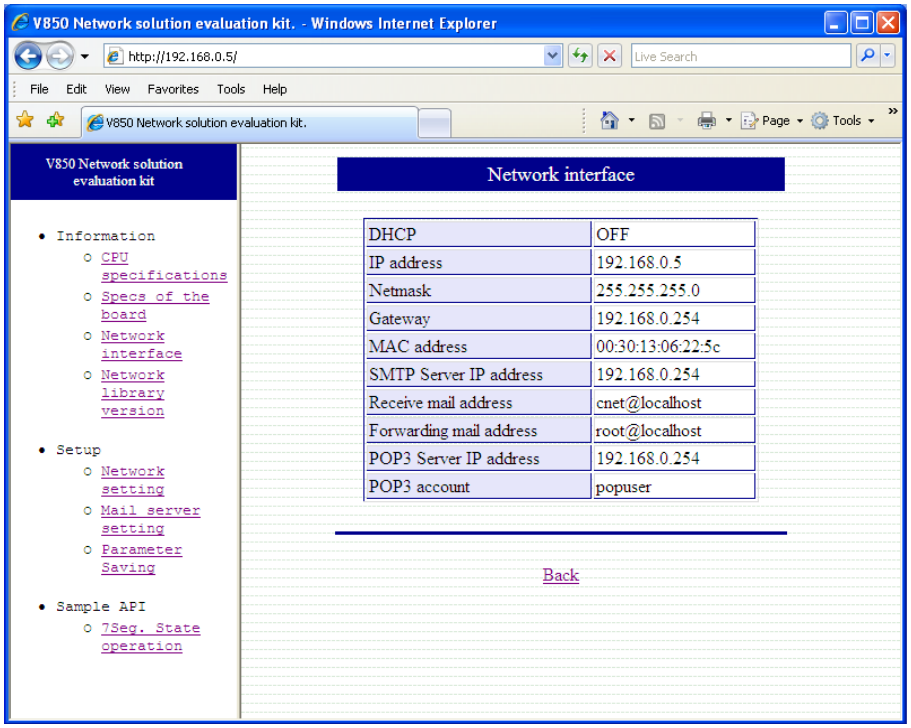


Figure 41: Network Interface Information Page

6. Still in the *Information* section, the last subsection gives you the Network library version:

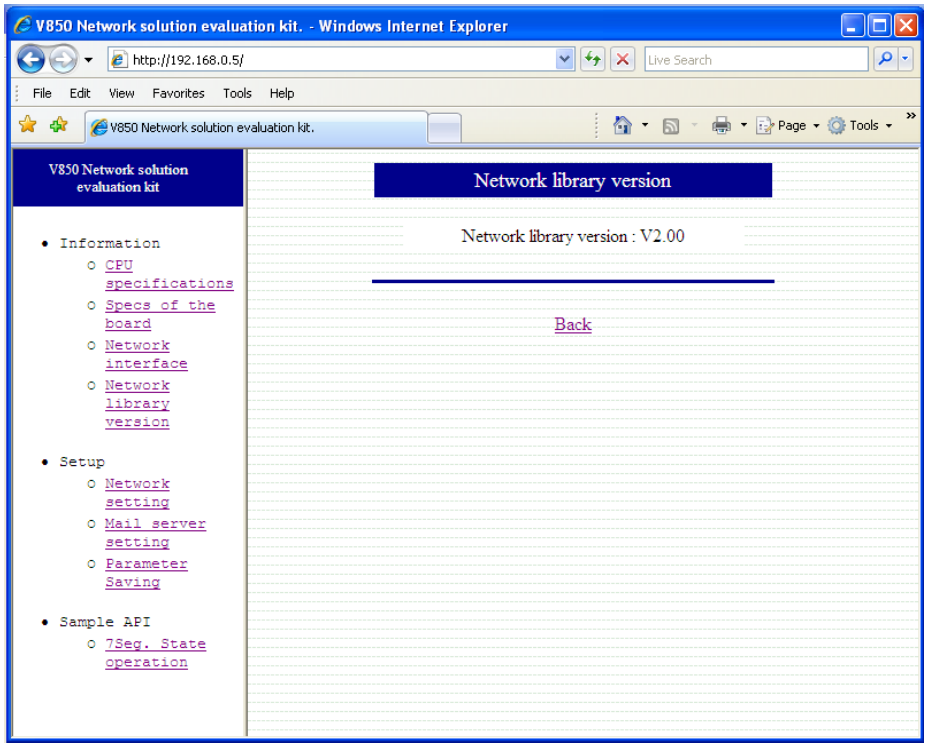


Figure 42: Network Library Version Information Page

7. The *Setup* section consists of Network and Mail server setting pages, as well as a Parameter saving page to write the parameters saved in these two setting pages to the Flash memory.

   You can use the Network setting page to configure the IP address, the Subnet mask and the Gateway:

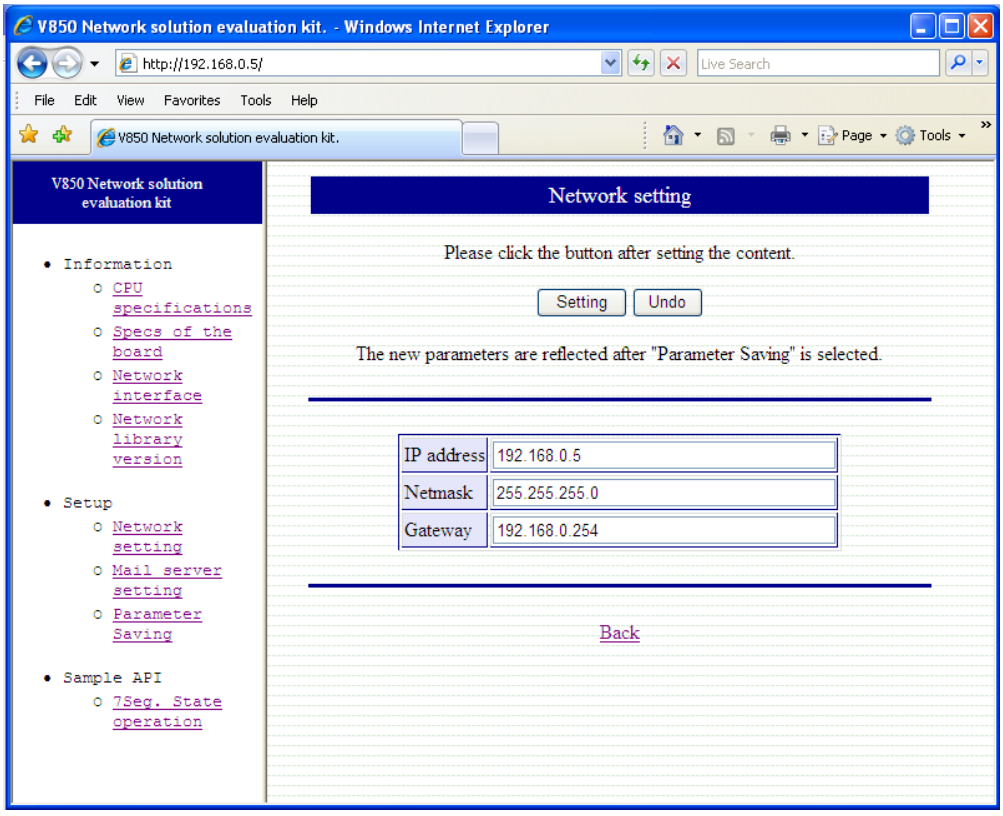


Figure 43: Network Setting Page

8. The Mail server setting page below is used to configure the e-mail server functionality.

   The following settings are available:

   - The IP address of the SMTP server (Example: 192.168.0.254).
   - The receive mail address that specifies the e-mail address to which the incoming e-mails arrive.
   - The forwarding mail address that specifies the e-mail address used to automatically forward the outcoming e-mails to the recipient.
   - The IP address of the POP3 server (Example: 192.168.0.254).
   - The account and the password of the POP3 server that are needed to collect the e-mails received to the *V850ES/Jx3-E - Network it!* board.
   - The Mail acquisition interval that defines the time interval used to check the POP3 server to determine whether there are confirmations of new e-mails received. Please reduce the acquisition interval value when the load of e-mails on the POP3 server increases.

   Finish by pressing the “Setting” button to save the new parameters.

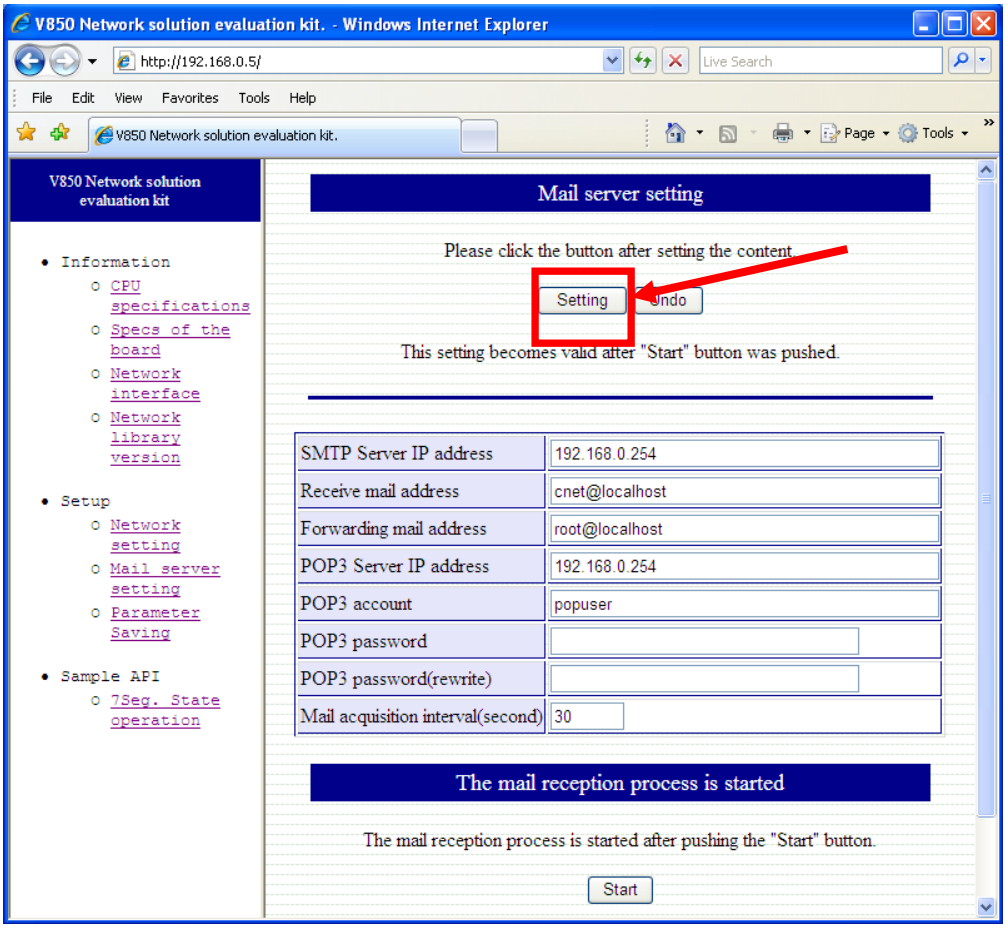


Figure 44: Mail Server Setting Page

9. Please note that the Parameter Saving (Writing in the Flash ROM) option is not implemented.

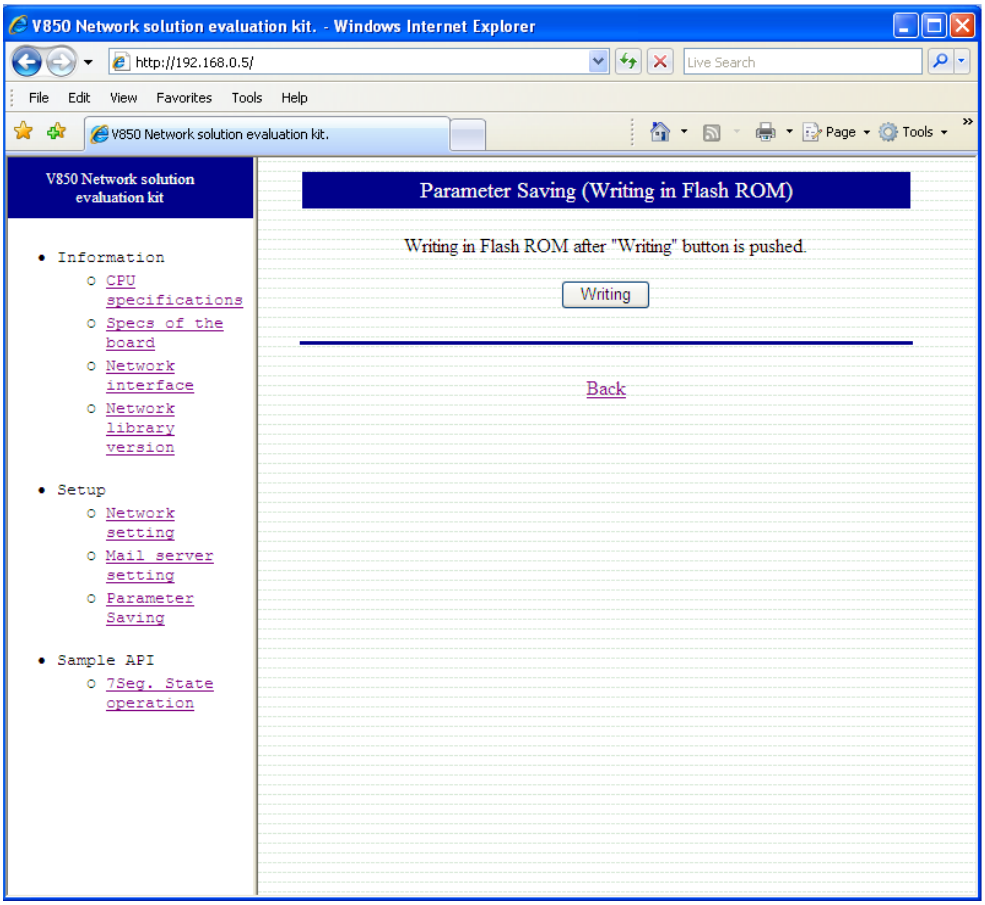


Figure 45: Parameter Saving Page

11.4 SMTP/POP3 e-mail server

The SMTP/POP3 e-mail server is the second sample program. Before executing it, it is necessary to properly configure your network using the HTTP web server described in the previous section.

This sample program brings e-mail functionality (via POP3 and SMTP protocols) to the *V850ES/Jx3-E - Network it!* board and performs the following tasks:

1. Confirmation of new e-mails to the POP3 e-mail server.
2. Collection of the new e-mails using the POP function.
3. Sending e-mails using the SMTP function according to the content of the e-mail received
   => The e-mail received is forwarded to a specific address.
4. Steps 1 to 3 are repeated at the interval set up using the Mail server setting page on the HTTP web server.

The corresponding sample code follows the software flowchart below:

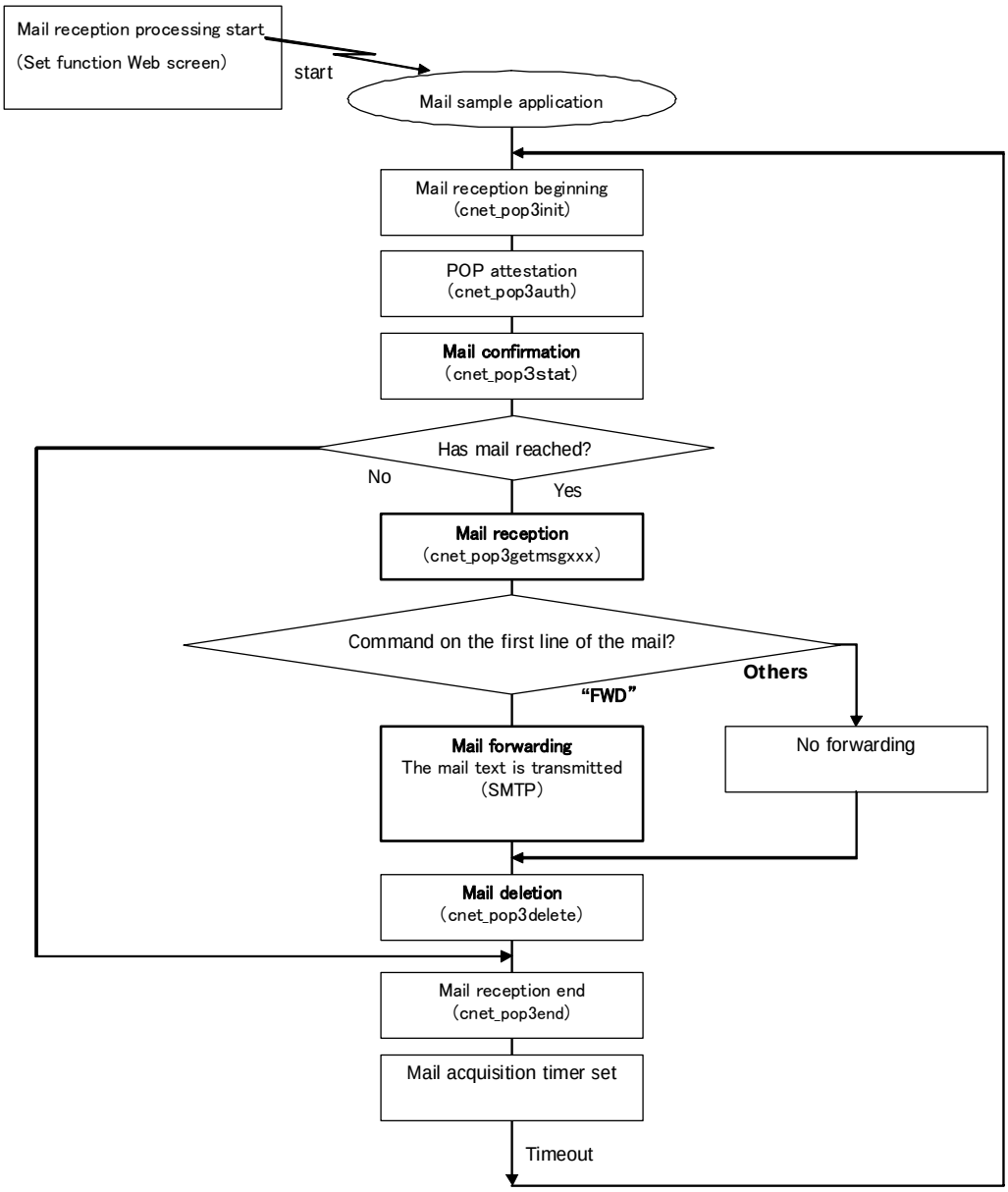


Figure 46: Mail Sample Application Flowchart

11.4.1 Development environment

The following schematic describes the specific development environment you need to setup in order to benefit from the e-mail functionality.

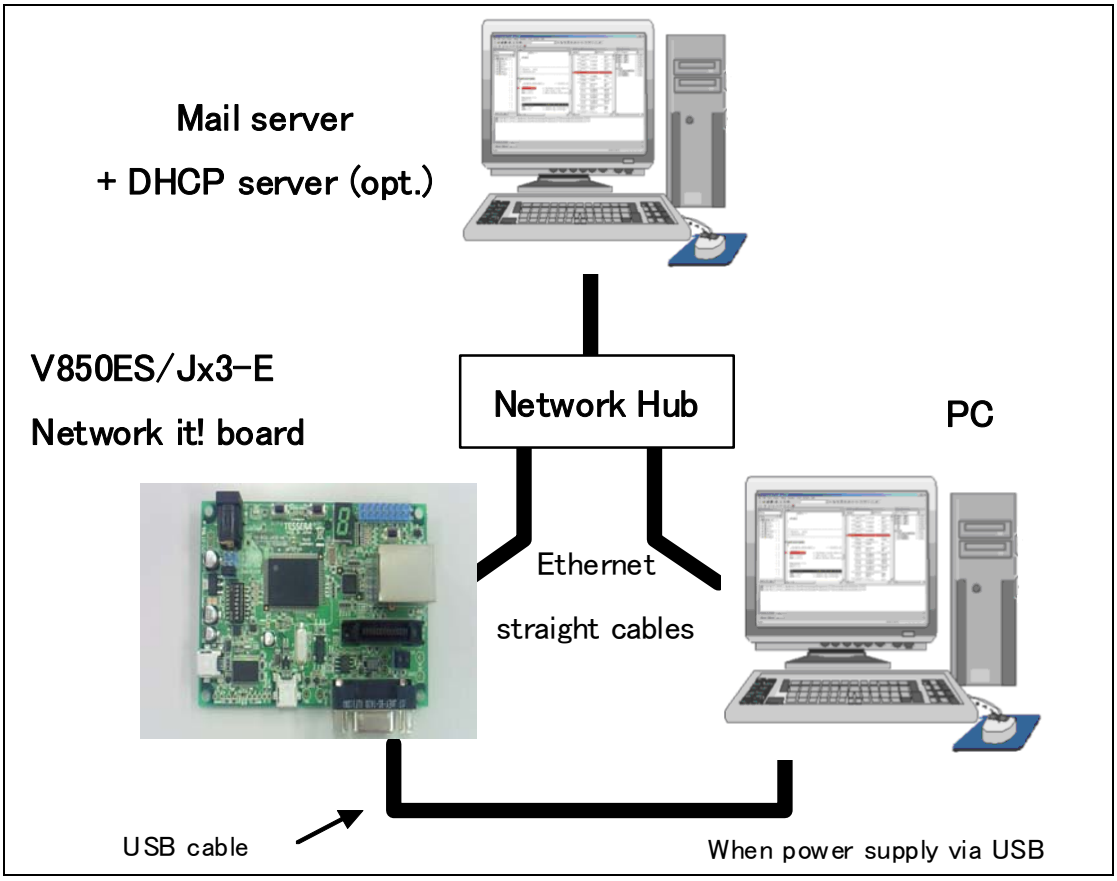


Figure 47: Connection Schematic to the E-mail Server

11.4.2 How to run the sample program

In order to run the e-mail sample program, please ensure that these different steps are correctly implemented:

1. Connect the *V850ES/Jx3-E - Network it!* board to an Ethernet network hub via a RJ45 straight-through cable, according to the connection schematic above.

2. Similarly, connect the PC, with the web browser, to the Ethernet network hub using a RJ45 straight-through cable. Also connect the USB cable between the *V850ES/Jx3-E - Network it!* board and the PC to supply the board.

3. Connect the mail server (PC) to the network hub with a straight-through cable.

4. The web browser on the PC is used to set the SMTP/POP3 e-mail server parameters. The mail reception processing is started once you have pressed the “Start” button on the Mail setting page displayed on your web browser.

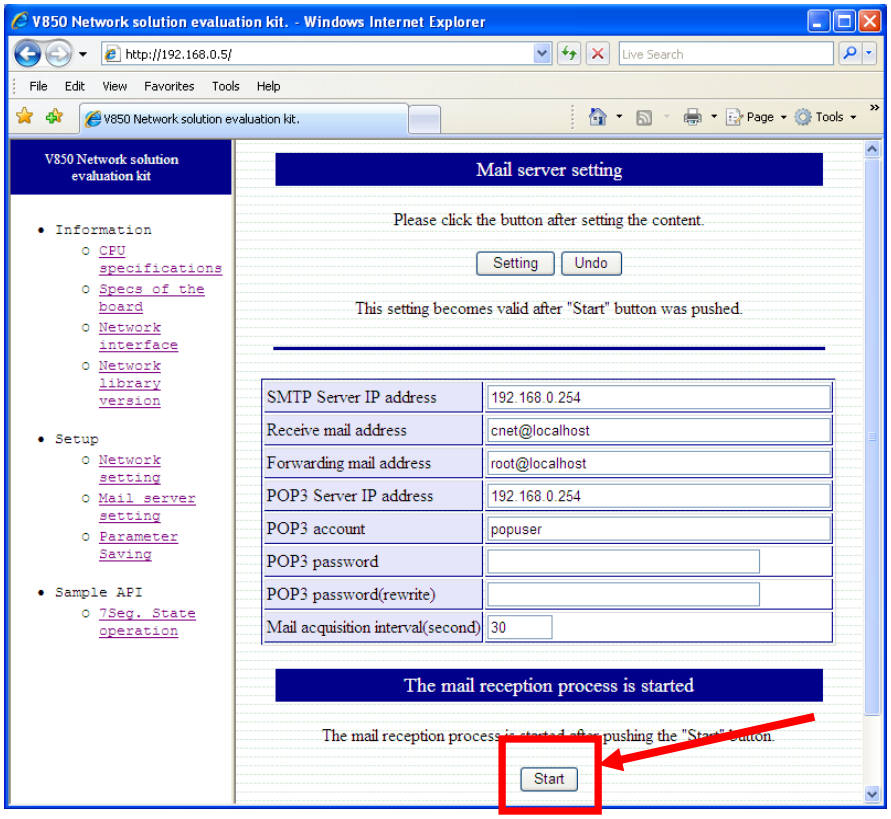


Figure 48: Start Button for Mail Reception Processing

5. When failing to connect to the POP3 server, please check the settings of the different addresses and POP3 account/password.

6. The *V850ES/Jx3-E - Network it!* board receives the e-mails from the POP3 server and these e-mails are transmitted to the user specified by the POP3 server account according to the command on the first line of the text.

   Please use the following format for the e-mails.

To: ******@***.***.com	← E-Mail address of the POP3 user
Subject: ******	← The content is arbitrary (Up to 10 characters)
(The first line of text)	← Command
(The second line of text)	
:	← When the mail is forwarded, the transmitted content is described

   (up to 10 lines)

   ➢ Command on the first line of the e-mail:

   [**FWD**]
   If the command forward, "FWD", is entered, the e-mail is forwarded from the second line of the text to the address specified in the Mail server setting web page.

   [**(Others)**]
   E-mails that don't contain the "FWD" command on the first line of the text are deleted without doing any specific operation.

11.5 DHCP client

The *V850ES/Jx3-E - Network it!* board can also benefit from Dynamic Host Configuration Protocol.

To enable DHCP, set the variable “CONFIG_DHCP” to 1 as shown in the screenshot below.

This variable can be found in the header file “config.h” located under the following directory:
`\Sample Programs\TK-850_Jx3-E_IAR_mailSample\Program Files\NEC Electronics Tools\smp850e\cnet\TK-850_Jx3-E\include`

```
#ifndef __CONFIG_H__
#define __CONFIG_H__

/*****************************************************************************/
/* Select Link Layer (Ethernet or PPP) */
#define CONFIG_LINKLAYER                1                                   /* 1: Ethernet, 2: PPP */
/*****************************************************************************/
/* Network parameter (LAN) */
#if (CONFIG_LINKLAYER == 1)
#define CONFIG_DHCP                             1                                       /* 0: OFF, 1: ON */
#define CONFIG_MY_IPADDRESS             0x0500a8c0                      /* for no DHCP */
#define CONFIG_NETMASK                  0x00ffffff                      /* for no DHCP */
#define CONFIG_GATEWAY                  0xfe00a8c0                      /* for no DHCP */
#define CONFIG_DNS_SERVER1              0x0100a8c0                      /* for no DHCP */
#define CONFIG_DNS_SERVER2              0x00000000                      /* for no DHCP */
#define CONFIG_DOMAIN                   "localdomain"           /* for no DHCP, MAX 64 characters */
#define CONFIG_HOSTNAME                 "tk850_jx3e"            /* MAX 64 characters */
#endif
```

Figure 49: Variable “CONFIG_DHCP” for DHCP Activation

11.6 7-segment LED control

This sample program performs the control of an on-board 7-segment LED by displaying different numbers. Similarly to the e-mail sample program, the 7-segment LED mounted on the *V850ES/Jx3-E - Network it!* board can be controlled using the HTTP web server running with a web browser.

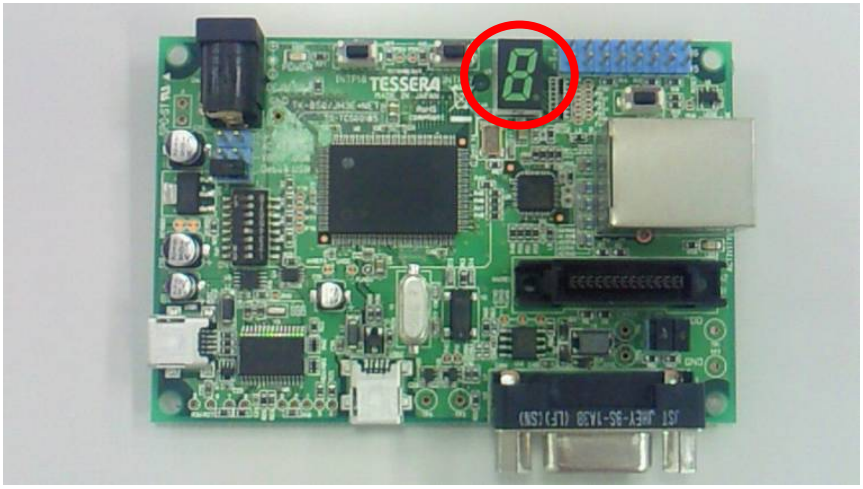


Figure 50: 7-Segment LED Location

The corresponding sample code follows the software flowchart below:

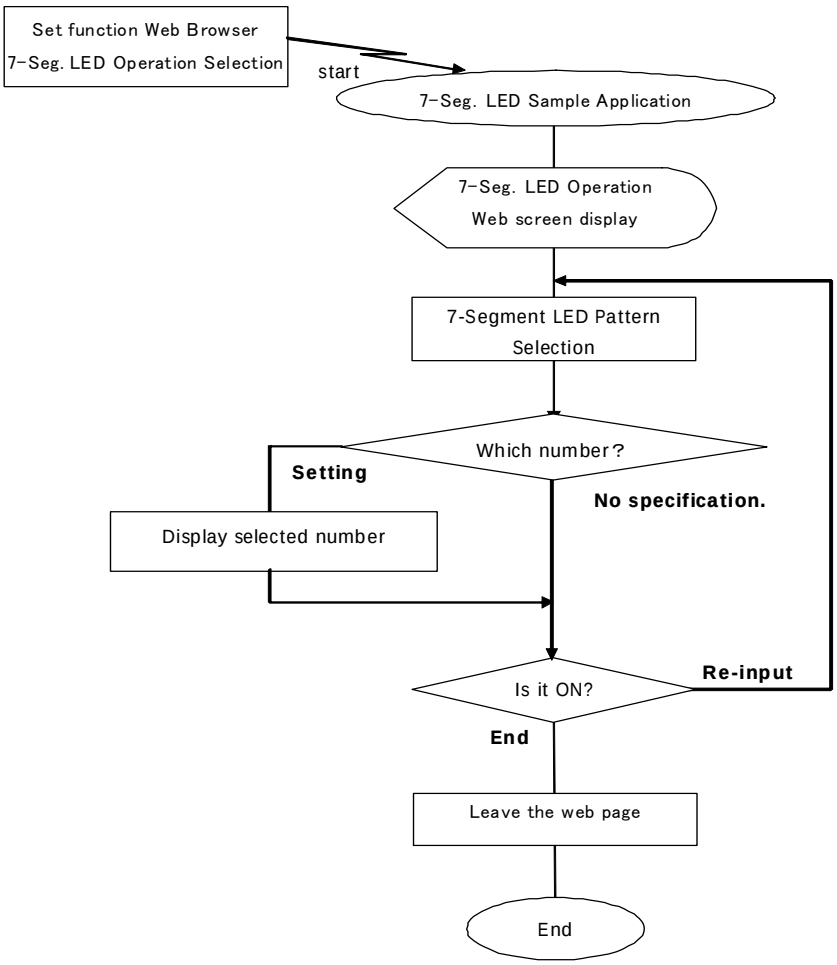


Figure 51: 7-Segment LED Control Flowchart

11.6.1 Development environment

The following schematic describes the specific development environment you need to setup in order to control the 7-segment LED.

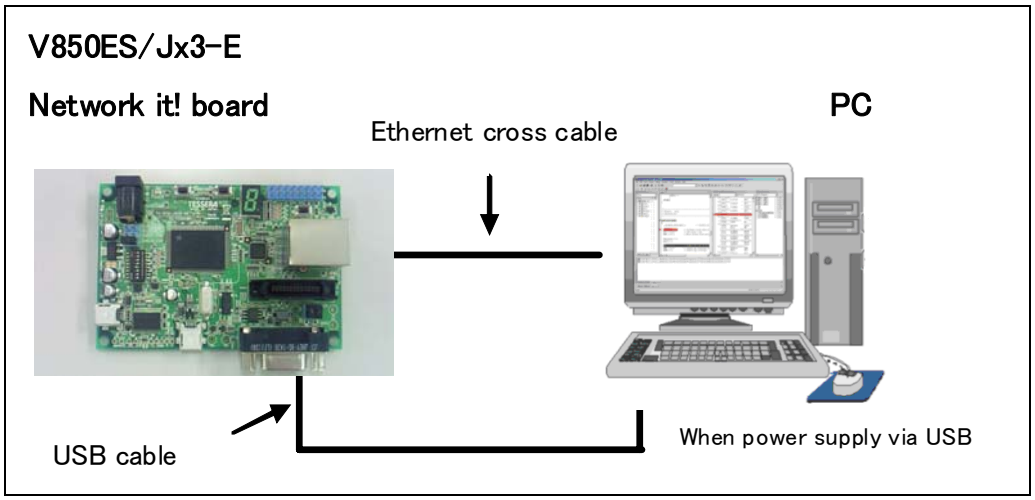


Figure 52: Connection Schematic for 7-Segment LED Control

11.6.2 How to run the sample program

1. Connect the *V850ES/Jx3-E - Network it!* board to the PC, that will run the web browser, via an Ethernet RJ45 cross cable.

2. Also connect the USB cable between the *V850ES/Jx3-E - Network it!* board and the PC to power the board.

3. Open the web browser on the PC. Type the following address in the URL bar to connect to the HTTP web server of the *V850ES/Jx3-E - Network it!* board:
   http://192.168.0.5/

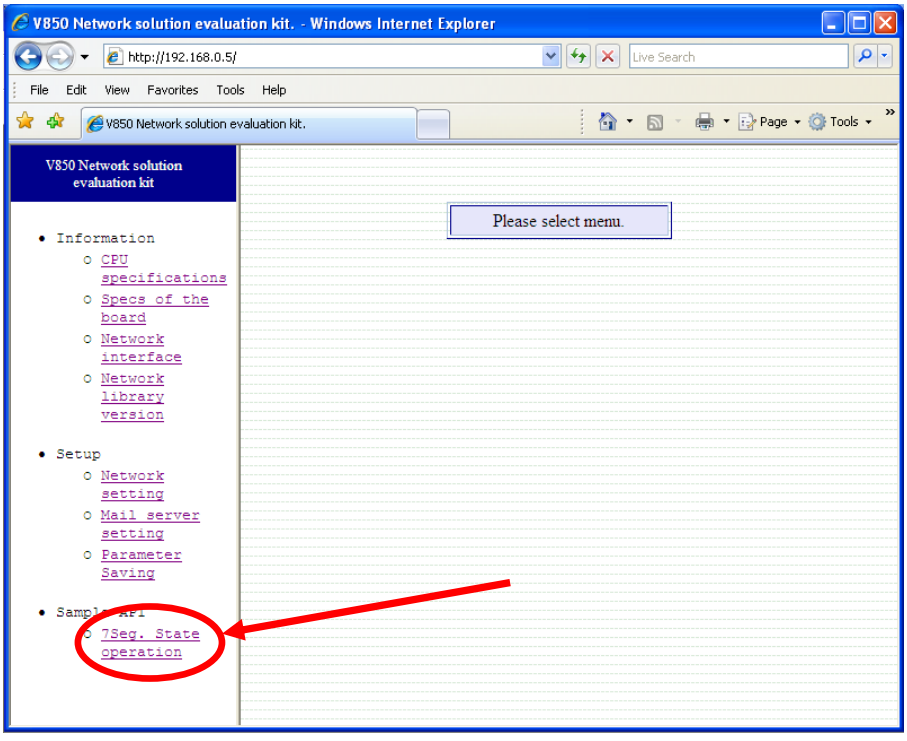


Figure 53: 7-Segment LED Control via the HTTP Web Server

4. The 7-segment LED control page is displayed.

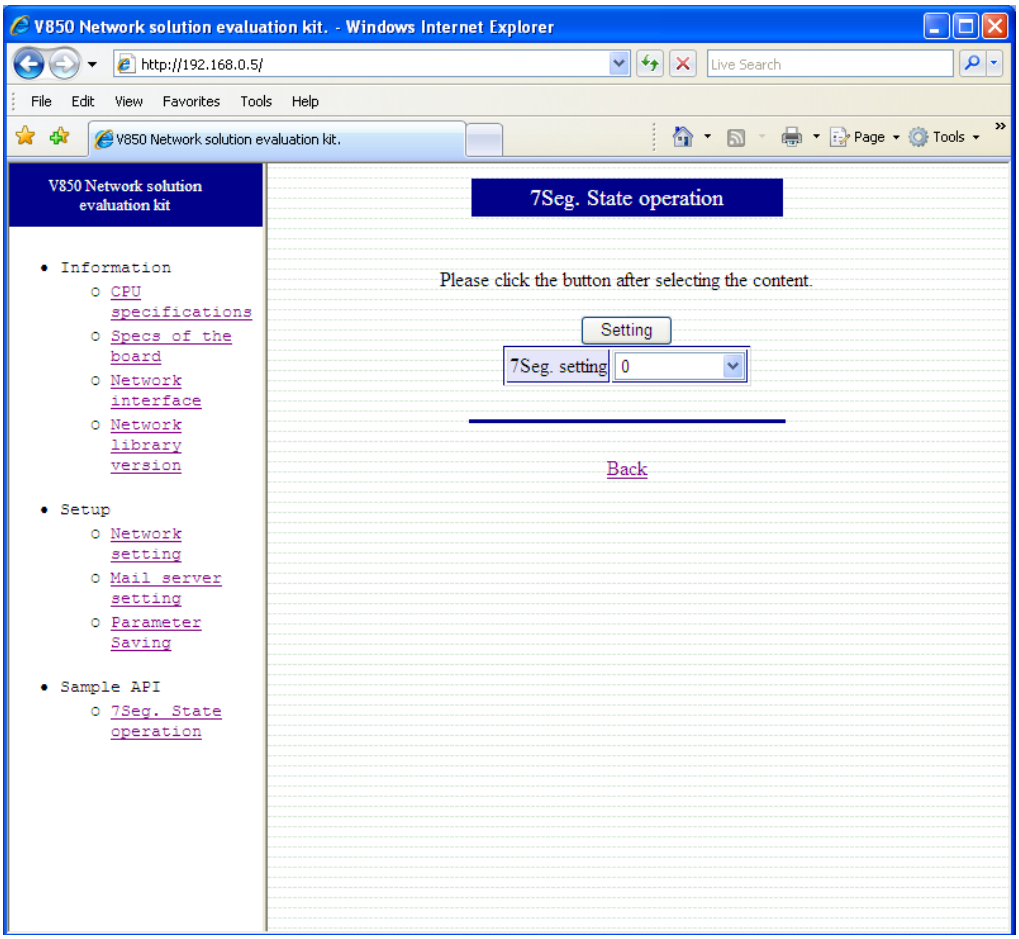


Figure 54: 7-Segment LED Control Page

5. Select the number you wish to display on the 7-segment LED using the drop-down menu.

6. Press the “Setting” button to apply the changes on the board.

7. The corresponding numbers is displayed on the on-board 7-segment LED, and is maintained until the next number change.

8. Please repeat steps 5 to 7 to continue selecting different numbers.

12. Cables

12.1 USB interface cable (Mini-B type)

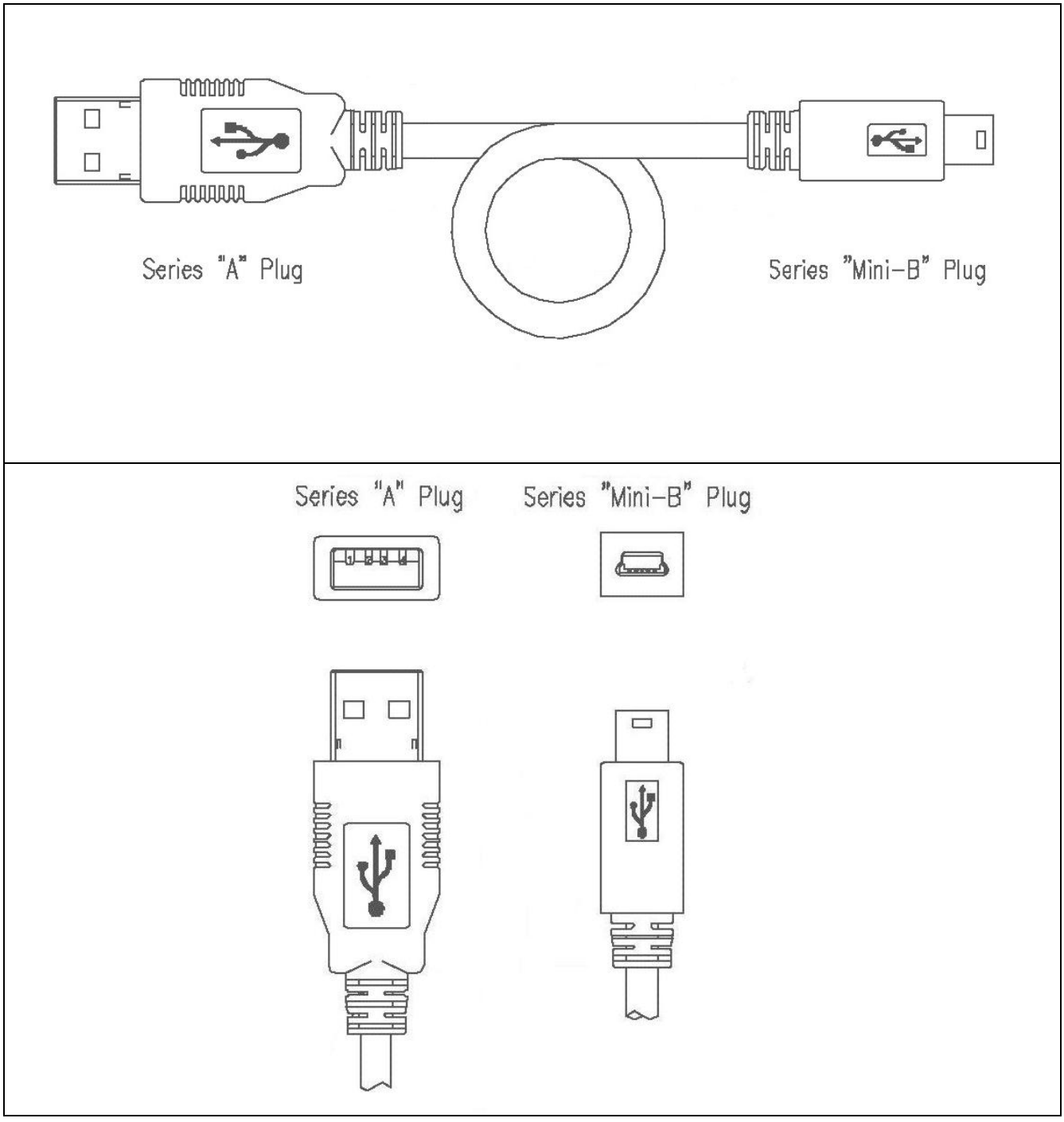


Figure 55: USB Interface Cable (Mini-B type)

13. Schematics

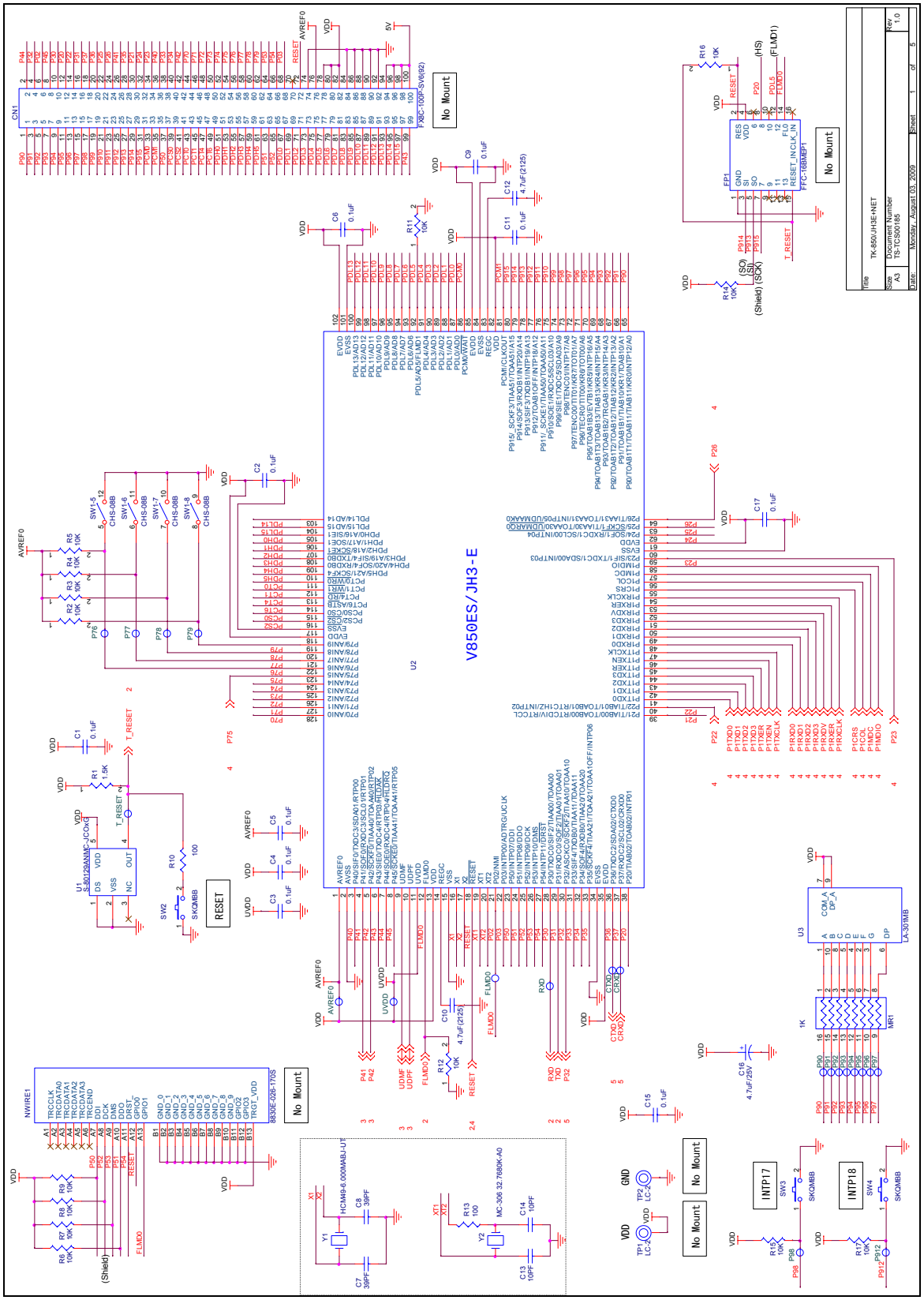


Figure 56: V850ES/Jx3-E - Network it! Schematics 1/5

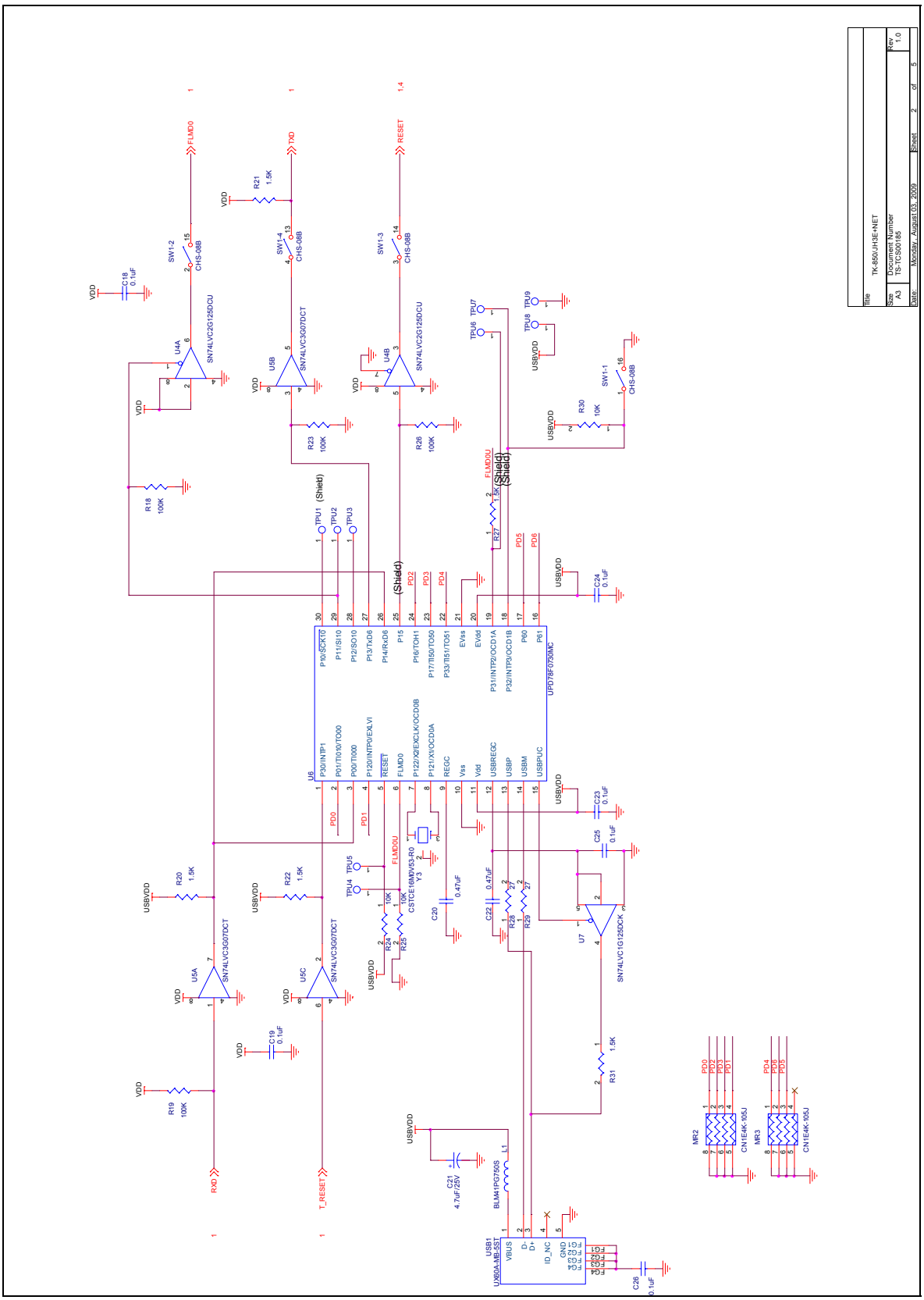


Figure 57: V850ES/Jx3-E - Network it! Schematics 2/5

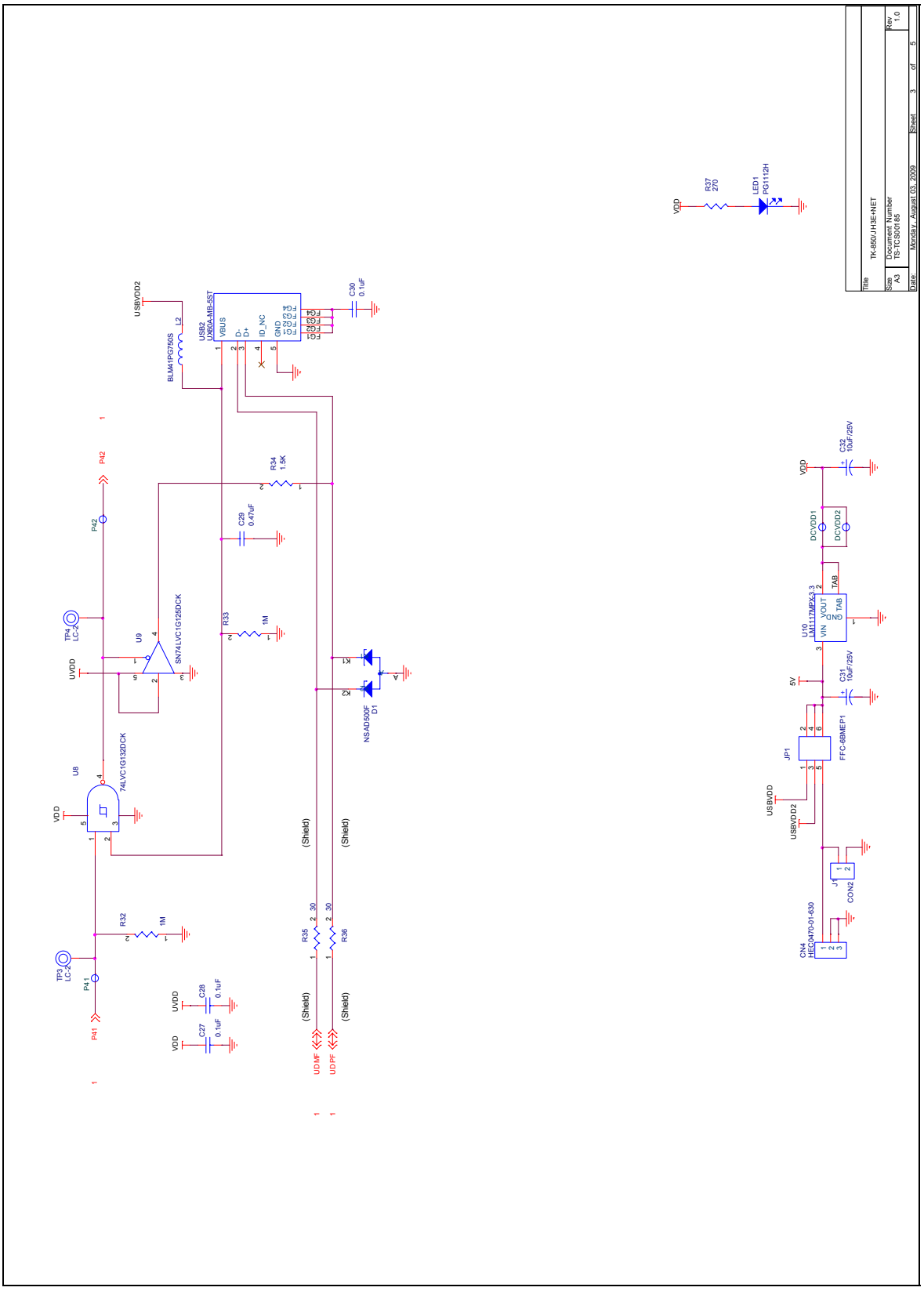


Figure 58: V850ES/Jx3-E - Network it! Schematics 3/5

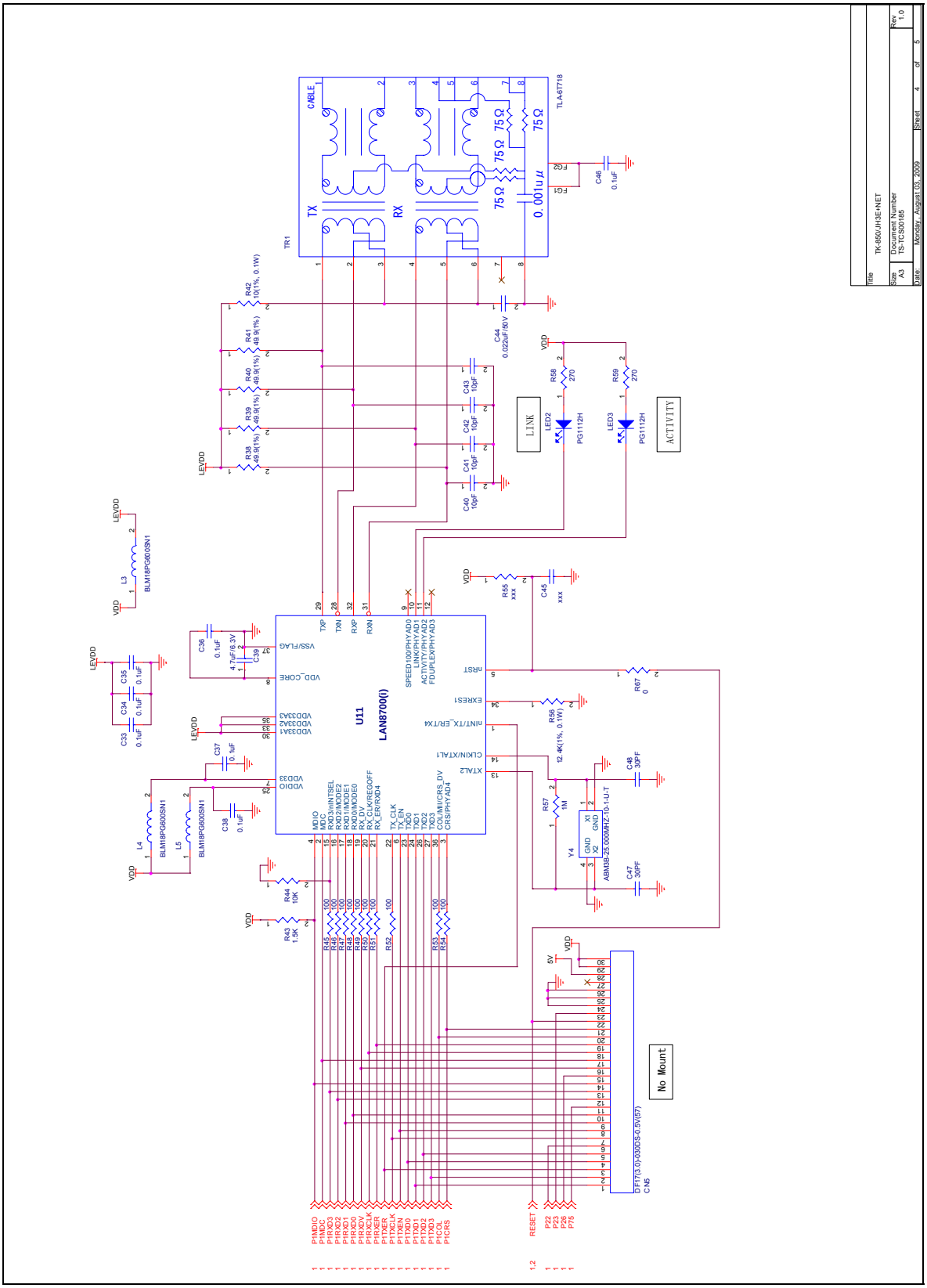


Figure 59: V850ES/Jx3-E - Network it! Schematics 4/5

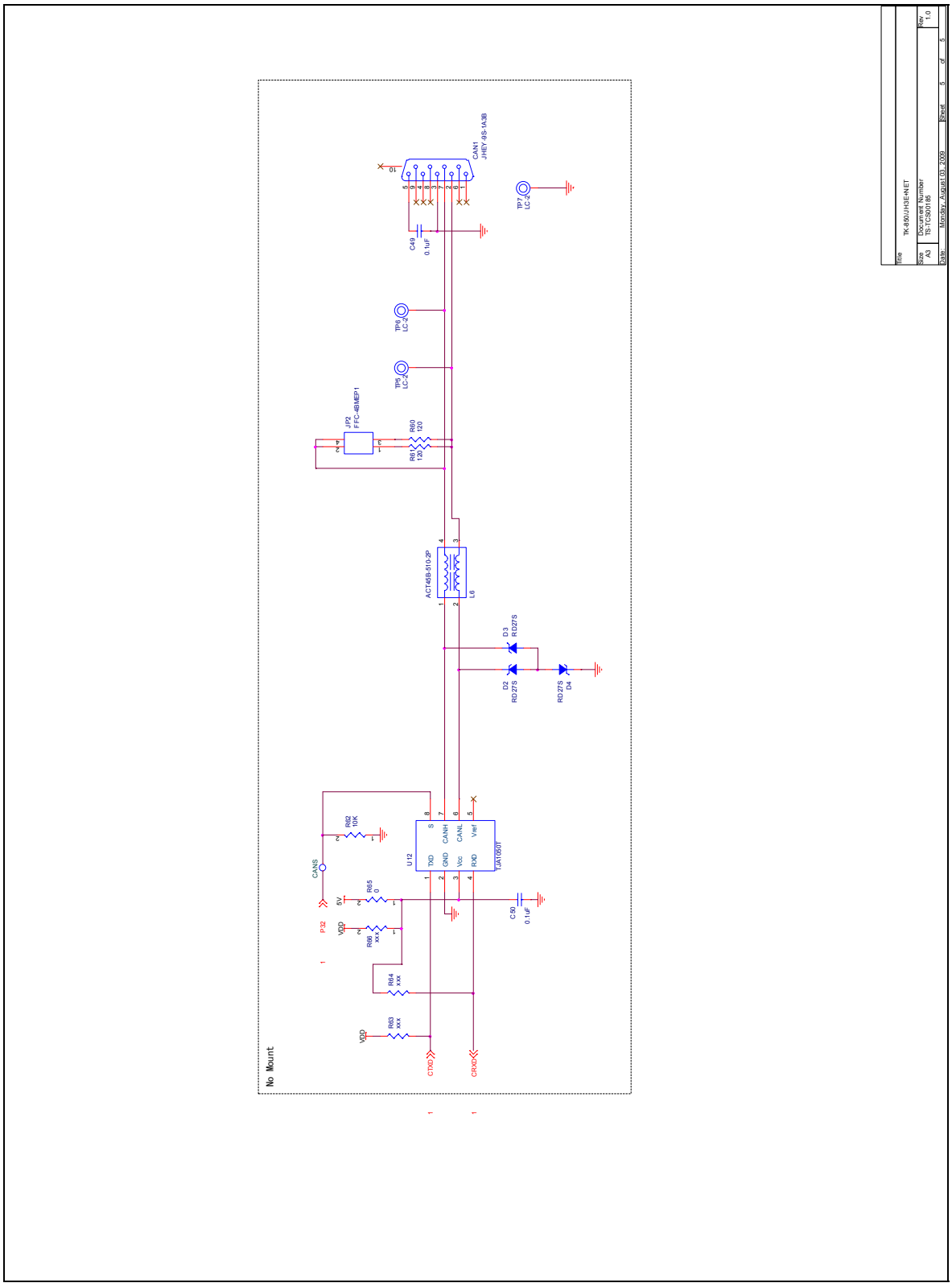


Figure 60: V850ES/Jx3-E - Network it! Schematics 5/5

[MEMO]